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ABSTRACT

This document contains two learning activity packets (LAPs) for the "power saws and drilling machines" instructional area of a Machine Shop I course. The two LAPs cover the following topics: power saws and drill press. Each LAP contains a cover sheet that describes its purpose, an introduction, and the tasks included in the LAP; learning steps (checklist); and various assignment sheets. Materials are illustrated with line drawings. The LAPs are referenced to a curriculum guide for the Machine Shop I course. (KC)

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ED279819

Learning Activity Packets (LAPs)

Machine Shop I

Section D — Power Saws and Drilling Machines

LAP #13 — Power Saws
LAP #14 — Drill Press

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State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for MACHINE SHOP I

LAP NO. _____ CODE: _____

MAJOR INSTRUCTIONAL AREA

POWER SAWS AND DRILLING MACHINES

INSTRUCTIONAL UNIT

POWER SAWS
SECTION D--UNIT I

LEARNING ACTIVITY PACKET NO.
13

PREREQUISITE LAP(S)
1, 2, 3, 4, 5

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance tasks for "Power Saws." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a SKILLED or MODERATELY SKILLED competency level in the performance of jobs associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to use power saws correctly and safely. The student will become able to get the correct band speeds, select the proper type of blade, and perform general maintenance on power saws.

TASKS INCLUDED IN THIS LAP:

1. Weld a band saw blade.
2. Coil and uncoil a band saw blade.
3. Cut stock with horizontal band saw.
4. Cut steel bar stock with vertical band saw.
5. Cut aluminum plate to layout with vertical band saw.

MACHINE SHOP I
POWER SAWS
SECTION D--UNIT I

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps.

_____1.	Read	Unit and Specific Objectives, page 1-D.
_____2.	Complete	Power Saws Pre-Test, LAP page 9.
_____3.	Study	The sections of the Information Sheet, pages 5-D through 34-D, indicated by your instructor on your Pre-Test. Be sure to refer to Transparency Masters when required.
_____4.	Refer	To Step 18 of your Pre-Test. If additional study is indicated for any of Sections I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XIV, or XV, continue to Step 5. Otherwise, proceed to Step 7.
_____5.	Do	LAP Assignment Sheet #1, LAP page 21.
_____6.	Do	LAP Assignment Sheet #2, LAP page 31.
_____7.	Refer	To Step 18 of your Pre-Test. If additional study is indicated for Section XIII, continue to Step 8. Otherwise, proceed to Step 11.
_____8.	Do	Assignment Sheet #1--Complete Power Saw Safety Test, page 35-D.

_____9.	Stop.	Have your instructor evaluate Assignment Sheet #1. If you score 100 percent, proceed to Step 11. Otherwise, continue to Step 10.
_____10.	Do	LAP Assignment Sheet #3 LAP page 41.
_____11.	Refer	To Step 18 of your Pre-Test. If additional study is indicated for Section XVI, continue to Step 12. Otherwise, proceed to Step 15.
_____12.	Do	Assignment Sheet #2--Calculate Stock Lengths, page 37-D.
_____13.	Stop.	Have your instructor evaluate Assignment Sheet #2. If your instructor is satisfied with your performance, proceed to Step 15. Otherwise, continue to Step 14.
_____14.	Do	LAP Assignment Sheet #4, LAP page 45.
_____15.	Refer	To Step 18 of your Pre-Test. If additional study is indicated for Section XII, continue to Step 16. Otherwise, proceed to Step 19.
_____16.	Do	Assignment Sheet #3--Select Saw Blade for Different Jobs, page 41-D.
_____17.	Stop.	Have your instructor evaluate Assignment Sheet #3. If your instructor is satisfied with your performance, proceed to Step 19. Otherwise, continue to Step 18.
_____18.	Do	LAP Assignment Sheet #5, LAP page 47.

_____19. Check The tasks below which you feel that you can perform without supervision.

Student Check		Instructor Initials/Date	
		Skilled	Moderately Skilled
_____a.	Weld a band saw blade (22)	_____	_____
_____b.	Coil and uncoil a band saw blade (29)	_____	_____
_____c.	Cut stock with horizontal band saw (35)	_____	_____
_____d.	Cut steel bar stock with vertical band saw (41)	_____	_____
_____e.	Cut aluminum plate to layout with vertical band saw (47)	_____	_____

_____20. Discuss Your competency in each task with your instructor. Your instructor will initial each task in which you demonstrate sufficient competency. If all tasks have been initialed, proceed to Step 52. Otherwise, continue to Step 21.

_____21. Refer To Step 19a. If this task has been initialed, proceed to Step 27. Otherwise, continue to Step 22.

_____22. Study Job Sheet #1--Weld a Band Saw Blade, page 45-D.

_____23. Watch Slide/tape presentation "Weld a Band Saw Blade" (D-I-1).

_____24. Do Job Sheet #1--Weld a Band Saw Blade.

_____25. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19a and proceed to Step 27. Otherwise, repeat Steps 22-24 and then go to Step 26.

_____26. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19a and continue to Step 27. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 19a and continue to Step 27.

_____27. Refer To Step 19b. If this task has been initialed, proceed to Step 33. Otherwise, continue to Step 28.

_____28. Study Job Sheet #2--Coil and Uncoil a Band Saw Blade, page 51-D.

_____29. Watch Slide/tape presentation "Coil and Uncoil a Band Saw Blade" (D-I-2).

_____30. Do Job Sheet #2--Coil and Uncoil a Band Saw Blade.

_____31. Stop. Have your instructor evluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19b and proceed to Step 33. Otherwise, repeat Steps 28-30 and then go to Step 32.

_____32. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19b and continue to Step 33. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 19b and continue to Step 33.

_____33. Refer To Step 19c. If this task has been initialed, proceed to Step 39. Otherwise, continue to Step 34.

_____34. Study Job Sheet #3--Cut Stock with Horizontal Band Saw, page 37-D.

_____35. Watch — Slide/tape presentation "Cut Stock with Horizontal Band Saw" (D-I-3).

_____36. Do — Job Sheet #3--Cut Stock with Horizontal Band Saw.

_____37. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19c and proceed to Step 39. Otherwise, repeat 34-36 and then go to Step 38.

_____38. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19c and continue to Step 39. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 19c and continue to Step 39.

_____39. Refer — To Step 19d. If this task has been initialed, proceed to Step 45. Otherwise, continue to Step 40.

_____40. Study — Job Sheet #4--Cut Steel Bar Stock with Vertical Band Saw, page 61-D.

_____41. Watch — Slide/tape presentation "Cut Steel Bar Stock with Vertical Band Saw" (D-I-4).

_____42. Do — Job Sheet #4--Cut Steel Bar Stock with Vertical Band Saw.

_____43. Stop. — Have your instructor evluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19d and proceed to Step 45. Otherwise, repeat Steps 40-42 and then have your instructor initial Step 19d and go to Step 44.

_____44. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19d and continue to Step 45. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 19d and continue to Step 45.

_____45. Refer To Step 19e. If this task has been initialed, proceed to Step 51. Otherwise, continue to Step 46.

_____46. Study Job Sheet #5--Cut Aluminum Plate to Layout with Vertical Band Saw, page D.

_____47. Watch Slide/tape presentation "Cut Aluminum Plate to Layout with Vertical Band Saw" (D-I-5).

_____48. Do Job Sheet #5--Cut Aluminum Plate to Layout with Vertical Band Saw.

_____49. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19e and proceed to Step 51. Otherwise, repeat Steps 46-48 and then go to Step 50.

_____50. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19e and continue to Step 51. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 19e and continue to Step 51.

_____51. Refer To Step 19. If all tasks have been initialed, continue to Step 52. Otherwise, refer to the step indicated in parentheses after the unsigned task.

_____52. Review Information Sheet (page 5-D) and Assignment Sheets 1-3.

_____53. Take Power Saws Unit I Test (see your instructor). If your score is 85 percent or above, continue to the next Learning Activity Packet. If you do not score 85 percent or above, ask your instructor about additional study requirements and possible re-testing.

POWER SAWS

UNIT I

PRE-TEST

NAME_____ SCORE_____

DIRECTIONS: This test is to determine how much you already know about power saws. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you know the answer. Guessing may prevent you from receiving the lessons which are required.

1. Match terms associated with power saws to their correct definitions. Write the number of the term beside its correct definition.

_____a.	Amount of tension that saw blade is adjusted to	1.	Kerf
_____b.	Part made to hold work that will have other work performed on it	2.	Set
_____c.	Space from top of tooth to bottom	3.	Contouring
_____d.	Electrical wiring in saw motor	4.	Cutting speed
_____e.	Distance from one tooth to corresponding point of the next tooth	5.	Fixture
_____f.	Amount of material consumed each time the saw makes a cut	6.	Friction sawing
_____g.	Method of rolling up a saw blade	7.	Pitch
_____h.	Cutting a shape that is not straight	8.	Gullet
_____i.	Chip formed along saw cut	9.	Circumference
_____j.	Distance around a round object	10.	Coiling
_____k.	Use of speed and heat to saw		
_____l.	The bending of a portion of every other tooth toward one side and the alternate teeth toward the opposite side to allow clearance for the blade thickness		
_____m.	Number of feet of the blade that pass through the work in one minute (sfpm)		

2. Describe each of the following types of power saws.

   a. Reciprocating hacksaw -- _____

   _____

   _____

   b. Horizontal band saw -- _____

   _____

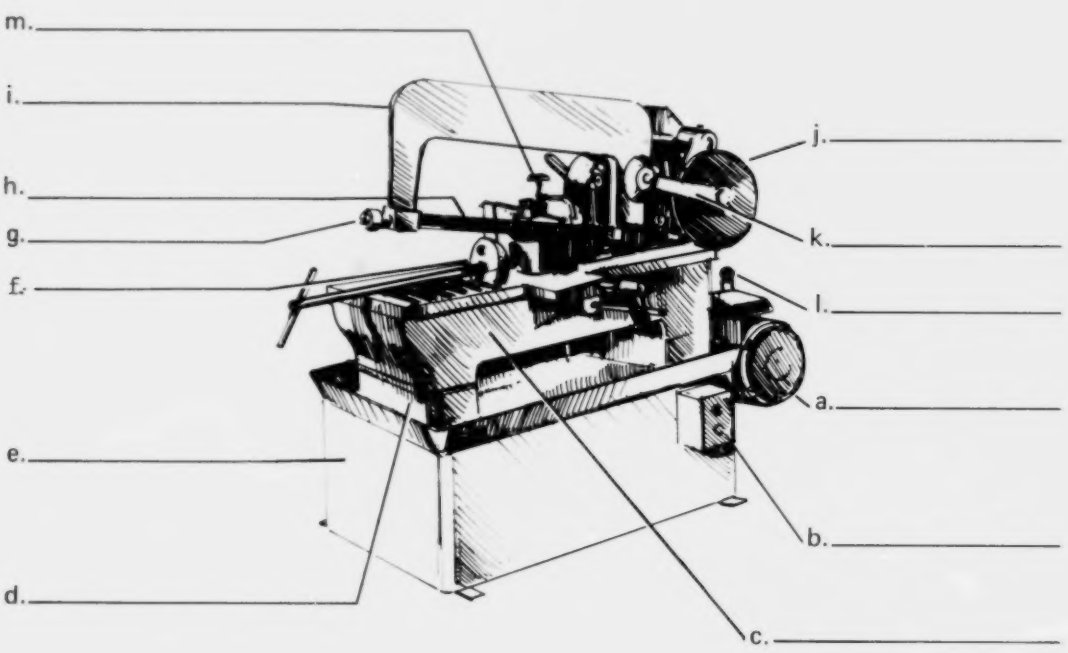
   _____

   c. Vertical band saw -- _____

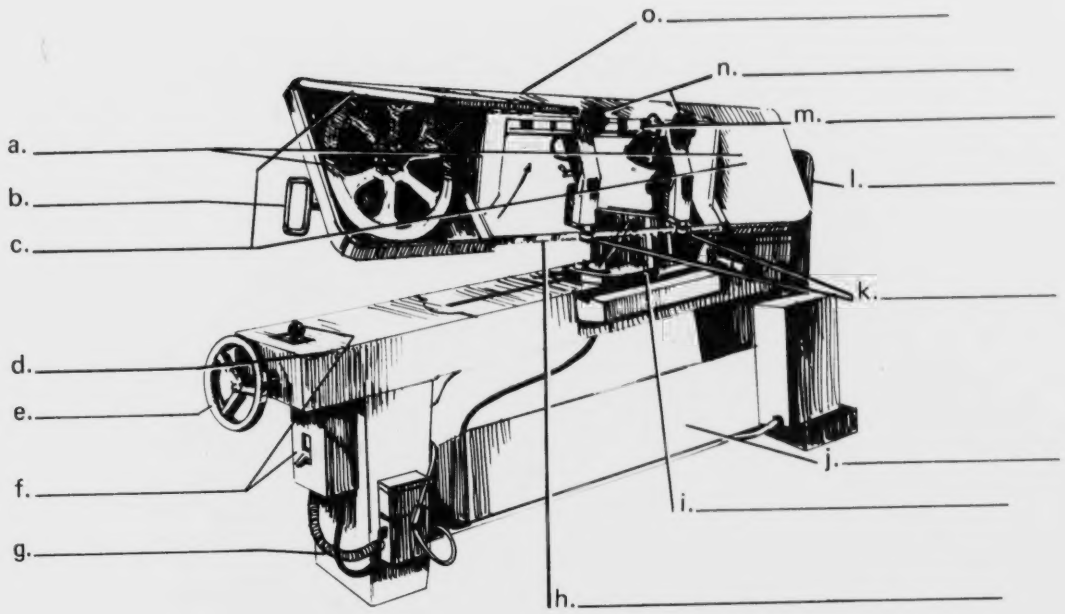
   _____

   _____

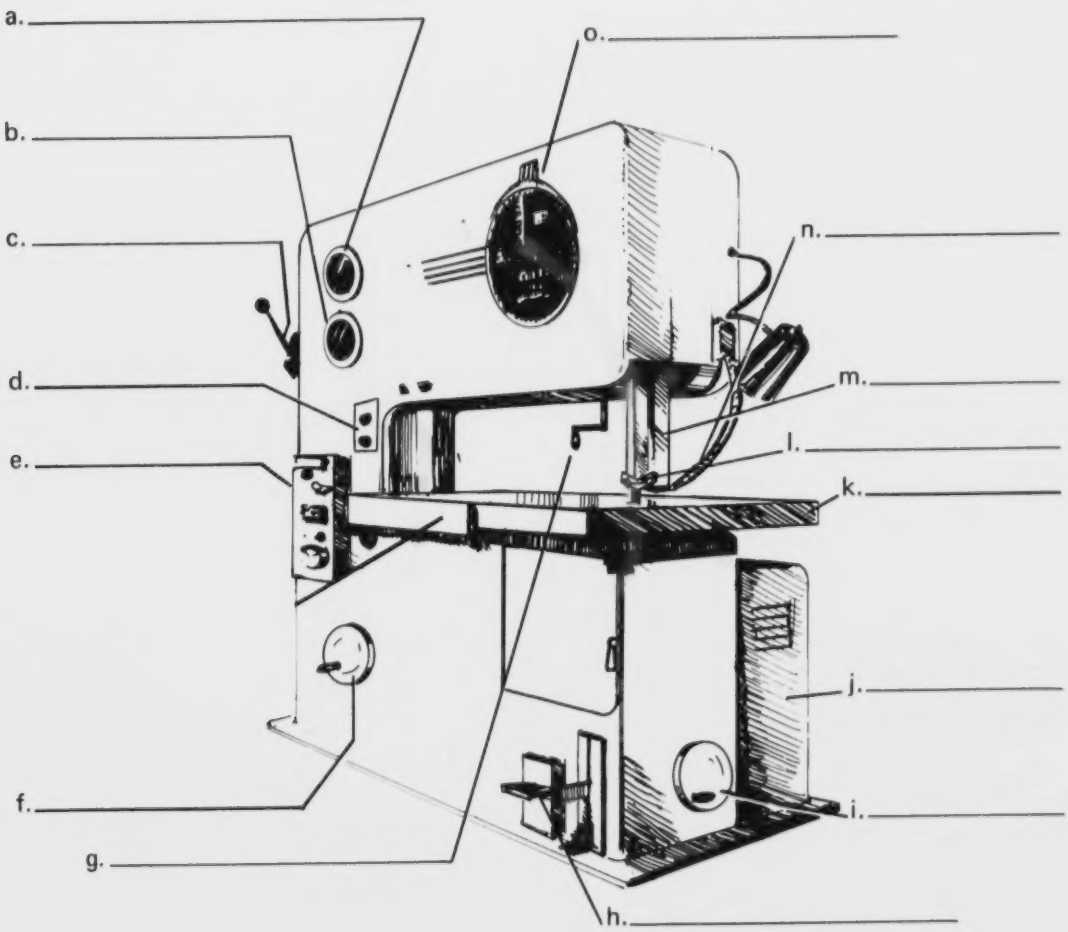
3. Identify major parts of a reciprocating hacksaw. Write the correct names in the blanks provided.



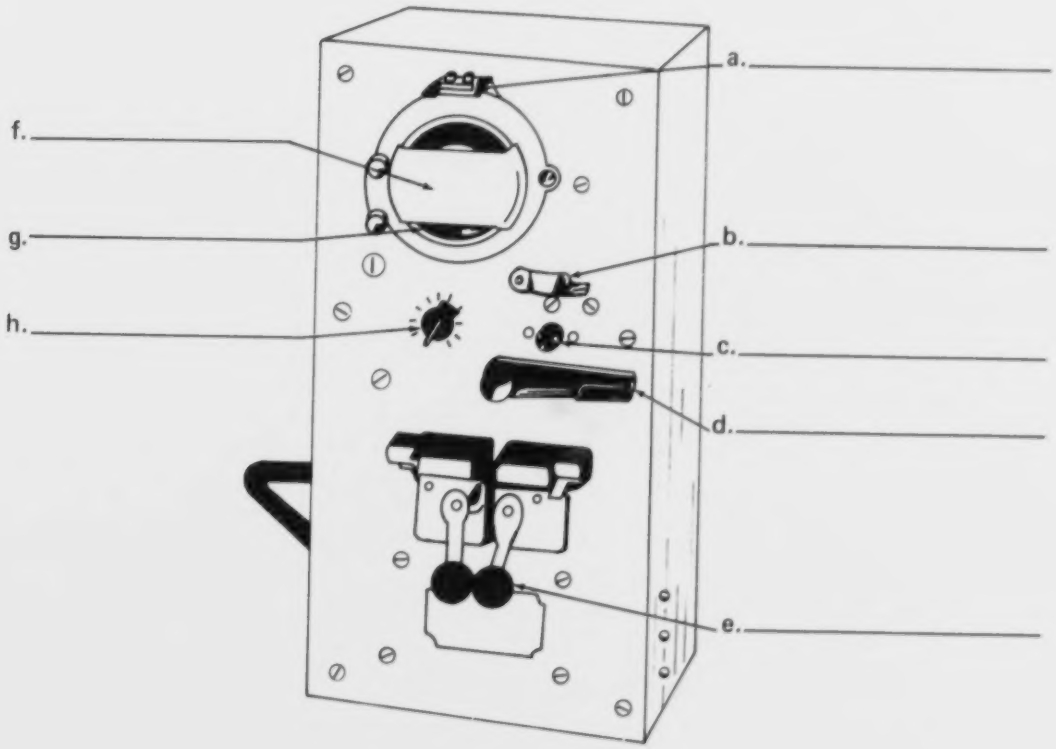
4. Identify major parts of a horizontal band saw. Write the names in the blanks provided.



5. Identify the major parts of a vertical band saw. Write the correct names in the blanks provided.



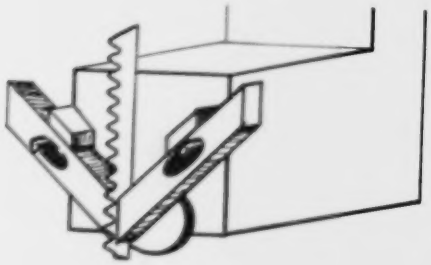
6. Identify the major parts of the butt welder. Write the correct names in the blanks.



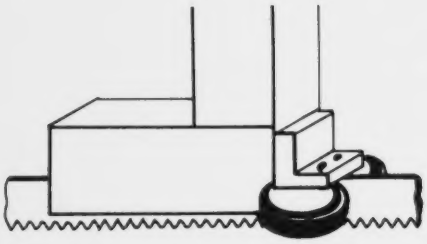
7. List operations which can be performed on horizontal and vertical band saws.

	Horizontal band saw	Vertical band saw
a.	_____	_____
b.	_____	_____
c.	_____	_____
d.	_____	_____
e.	_____	_____

8. Identify types of blade guides seen in the illustrations below. Write the correct names in the blanks.

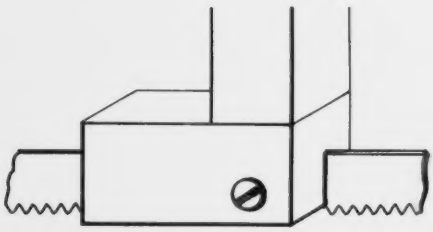


a. _____



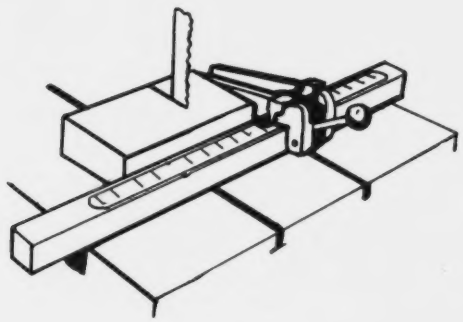
b. _____

c. _____



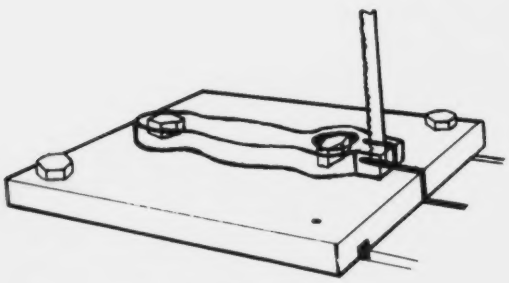
d. _____

9. Identify accessories used with power saws. Write the correct names in the blanks.

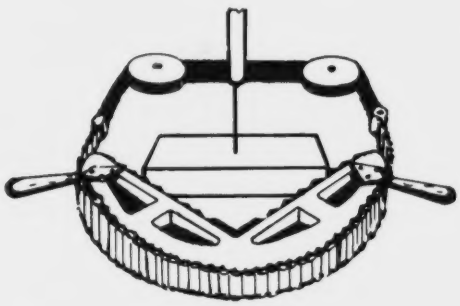


a. _____

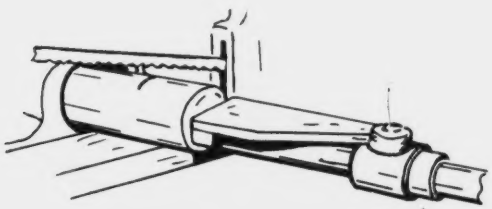
c. _____



b. _____



d. _____



e. _____

10. List methods for determining band saw speeds for different materials.

    a. _____

    b. _____

11. List factors which determine saw blade selection.

    a. _____

    b. _____

    c. _____

    d. _____

12. Select the correct saw blades for different jobs. Use the chart below and describe the type of blade you would use for each job described.

Material Thickness	Tooth Per Inch	Pitch
1/8" to 3/16"	24 teeth	.041
1/4" to 5/16"	18 teeth	.055
3/8" to 7/16"	14 teeth	.071
1/2" to 3/4"	10 teeth	.100
13/16" to 1"	8 teeth	.125
1 1/16" to 3"	6 teeth	.166
over 3"	4 teeth	.250

_____a. Used on a horizontal band saw to cut a machine steel bar 2" square

_____b. Used on a vertical band saw to cut 3/4" thick tempered aluminum plate

_____c. Used on a vertical band saw to cut a contoured surface in machine steel plate 1" thick

_____d. Used on a horizontal band saw to cut a 4" diameter steel pipe with 1/2" wall thickness

_____e. Used on a vertical band saw to cut a plastic (nylon) part from plate material 3/4" thick

_____f. Used on a vertical band saw to cut a slat in high carbon steel workpiece 1/2" thick

_____g. Used on a vertical band saw to cut machine steel plate 5/16" thick

13. State rules for safe use of power saws by telling how each of the following words or terms applies to power saw safety.

a. Covers and guards -- _____

_____

_____

b. Hands -- _____

_____

c. Upper guide -- _____

_____

d. Eyes -- _____

_____

e. Machine controls -- _____

_____

f. Saw blade -- _____

_____

g. Scraps -- _____

_____

h. Pusher -- _____

_____

i. Broken parts or improper operation -- _____

_____

j. Power -- _____

_____

k. Frame lock -- _____

_____

l. Blade -- _____

_____

m. Feed -- _____

_____

n. Long bars -- _____

_____

o. Chip screen -- _____

_____

p. Bending -- _____

_____

q. Burrs -- _____

_____

14. Describe care and cleaning of power saws. Explain how the following words or phrases apply to the care and cleaning of power saws.

a. Lubrication -- _____

_____

b. Brushes -- _____

_____

c. Coolant tank -- _____

_____

d. Chips -- _____

_____

e. Blade -- _____

_____

f. Table -- _____

_____

g. Guides -- _____

_____

15. State reasons for welding a band saw blade in the blanks provided.

    a. _____

    _____

    b. _____

    _____

    c. _____

    _____

16. Calculate material required for producing parts. A job requires 37 pieces of 1 1/2" steel bar machined to a length of 4 1/4". For this operation, the material should be rough cut with 1/8" allowed for machining. Assume that each saw cut removes 1/16" of material and that the stock comes in 12' lengths.

    a. How many 12' pieces of stock will be required for the production operation? _____

    b. How much material will be left over when the required parts have been cut? _____

17. Stop. Have your instructor evaluate your Pre-Test and mark the areas below which require additional study.

    Refer to Information Sheet, Sections:

_____I	_____IX
_____II	_____X
_____III	_____XI
_____IV	_____XII
_____V	_____XIII
_____VI	_____XIV
_____VII	_____XV
_____VIII	_____XVI

    You came here from LAP Step 2. If any of the above areas is checked, continue to LAP Step 3. Otherwise, proceed to LAP Step 19.

POWER SAWS
UNIT I

LAP ASSIGNMENT SHEET #1--POWER SAWS

NAME_____ SCORE_____

1. Match terms associated with power saws to the correct definitions. Write the correct numbers in the blanks.

_____a.	Part made to hold work that will have other work performed on it	1. Kerf
_____b.	Space from the top of tooth to bottom	2. Set
_____c.	Distance from one tooth to corresponding point of the next tooth	3. Contouring
_____d.	Amount of material consumed each time the saw makes a cut	4. Cutting speed
_____e.	Method of rolling up a saw blade	5. Fixture
_____f.	Cutting a shape that is not straight	6. Friction sawing
_____g.	Distance around a round object	7. Pitch
_____h.	Use of speed and heat to saw	8. Gullet
_____i.	The bending of a portion of every other tooth toward one side and the alternate teeth toward the opposite side to allow clearance for the blade thickness	9. Circumference
_____j.	Number of feet of the blade that pass through the work in one minute (sfpm)	10. Coiling

2. Complete the following definitions of different types of power saws.

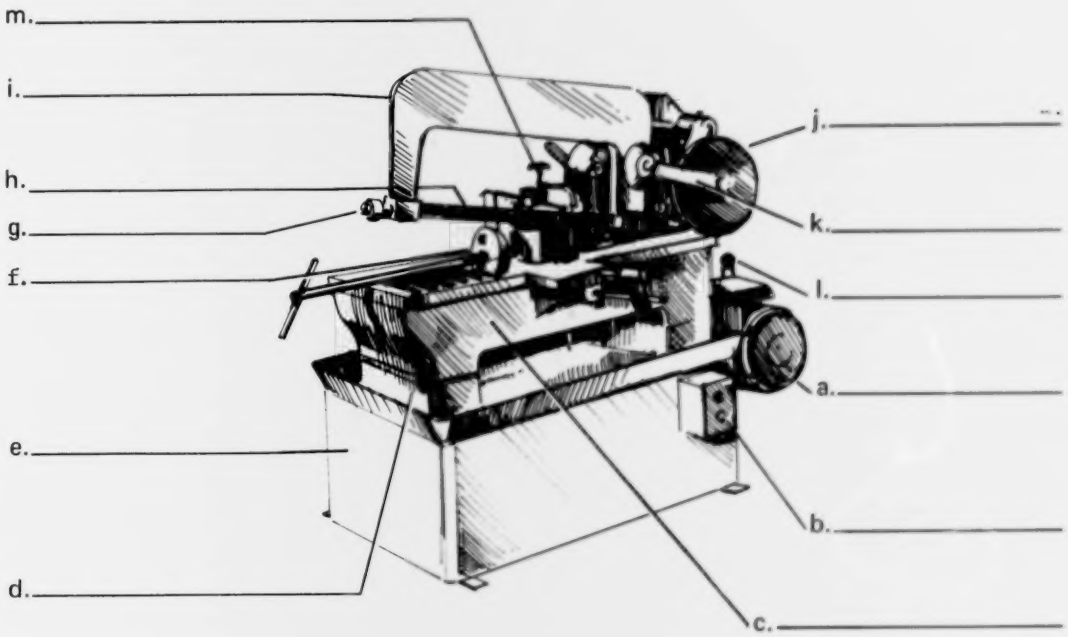
a. Reciprocating hacksaw -- Consists of a base with _____ and a frame with saw blade that moves _____ and _____ by means of a _____; is motor driven, with a v-belt and pulley for different speeds.

b. Horizontal band saw -- Consists of a base with vise and a frame with two _____ that carries a saw blade and adjustable _____ _____; is motor driven with v-belts and pulleys for different band speeds.

c. Vertical band saw -- Consists of a base with _____ and _____ _____ that carry a saw blade with adjustable _____ _____ _____; is motor driven with speeds obtained by _____ or _____ _____ pulley.

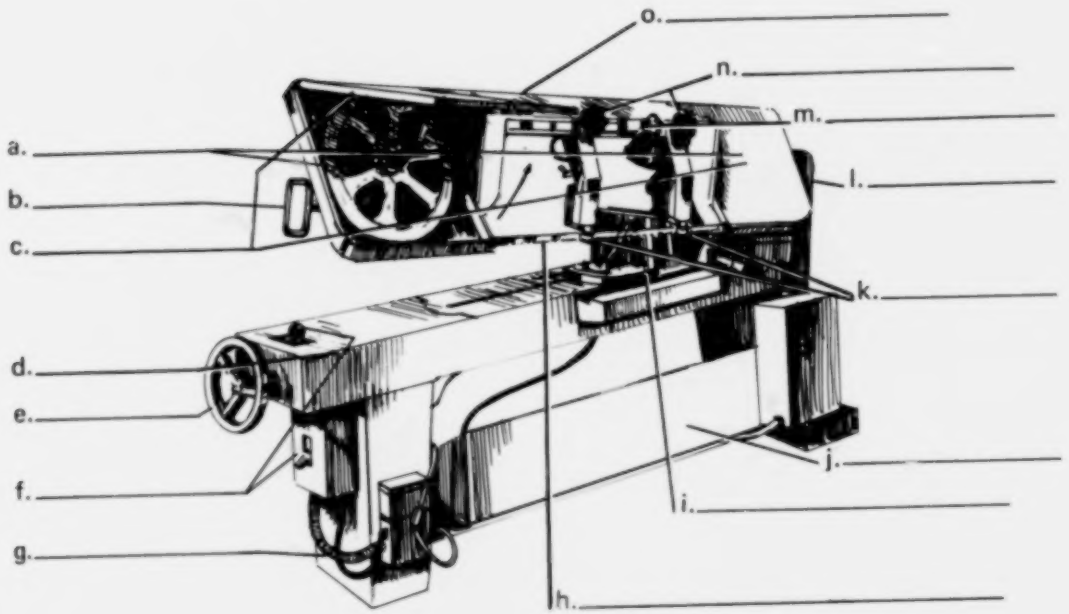
3. Identify major parts of a reciprocating hacksaw. Write the correct names in the blanks.

Table	Saw frame
Switch	Coolant valve
Motor	Blade tensioning nut
Gear shift	Vise
Connecting rod	Base
Crank-disc	Coolant tray
	Blade



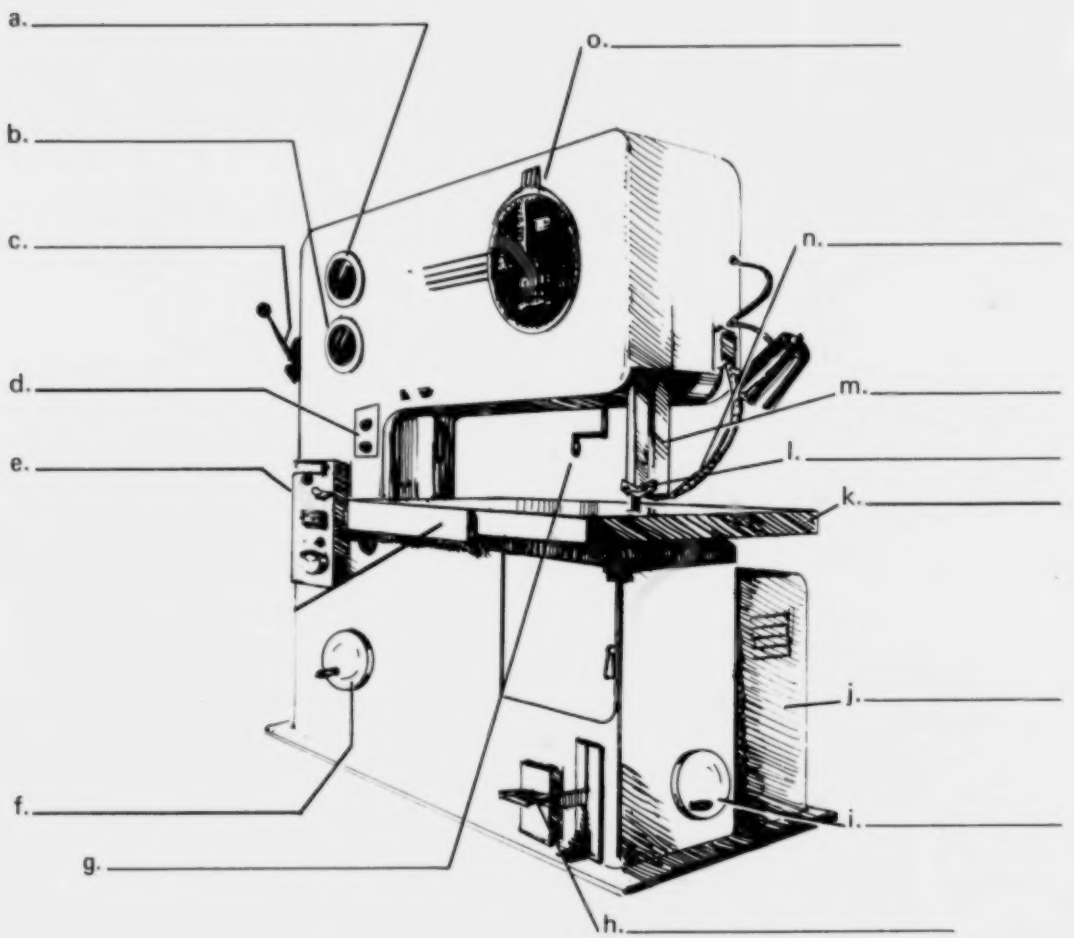
4. Identify major parts of a horizontal band saw. Write the correct names in the blanks.

Blade tension handle	Guide posts	Saw frame
Vise handwheel	Idler wheels	Frame weight
Shields	Band blade	Coolant tray
Base	Switch	Table
Saw guides	Vise	Motor and step pulleys



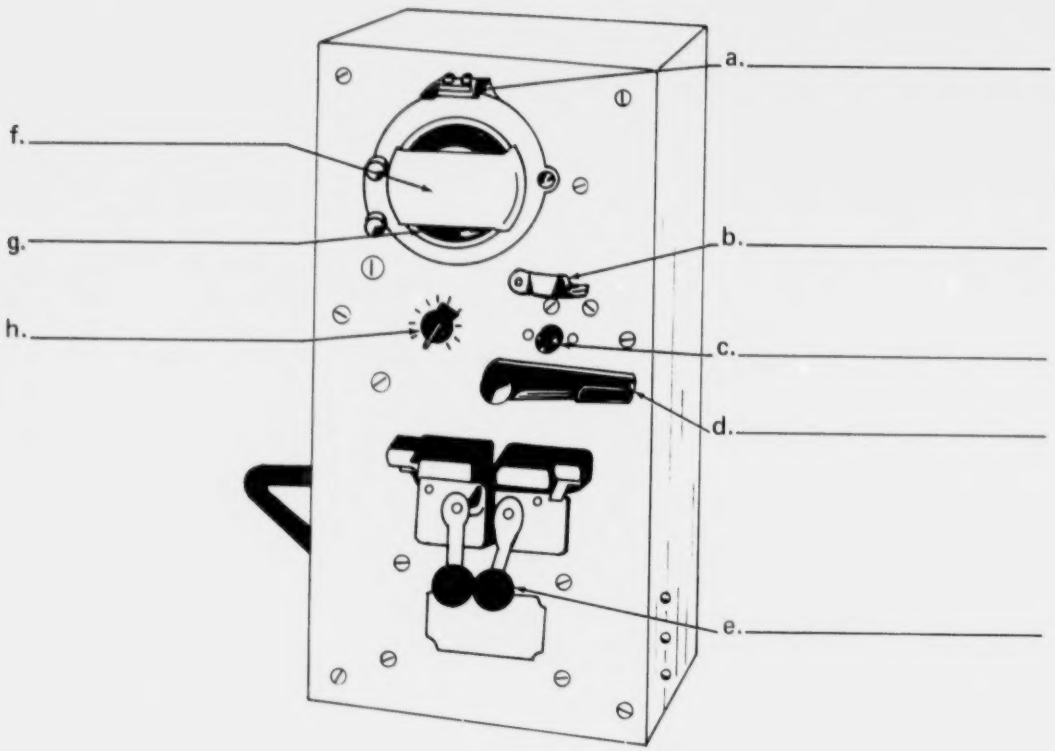
5. Identify major parts of a vertical band saw. Write the correct names in the blanks.

Blade guide	Speed control	Guide post
Blade cutter	Power feed handwheel	Blade tension indicator
Welder	Table	Job selector dial
Power feed foot pedal	Air jet	Motor cover
Speed indicator	Blade tension handle	Switch



6. Identify major parts of the butt welder. Write the correct names in the blanks.

Grinding wheel guard
Welding switch lever
Weld selector switch
Blade thickness gage
Blade clamps
Annealing button
Etching clamp
Grinding wheel



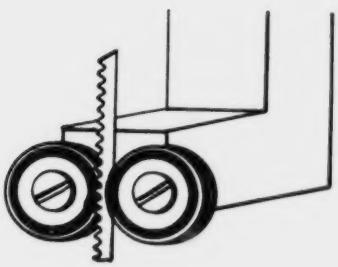
7. Complete the following chart by selecting operations from the list below. Write the name of each operation the saws can perform in the correct columns.

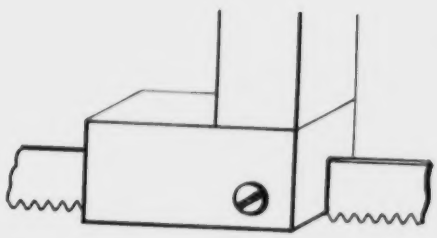
Filing	Contouring
Square cutting	Stack cutting
Angular cutting	Fixture work

Horizontal bandsaw	Vertical bandsaw

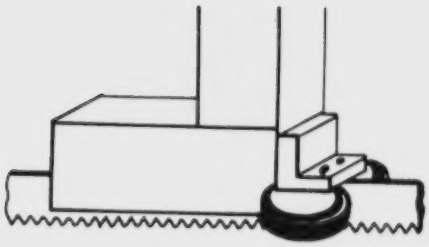
8. Identify types of blade guides seen in the illustrations below. Write the correct names in the blanks.

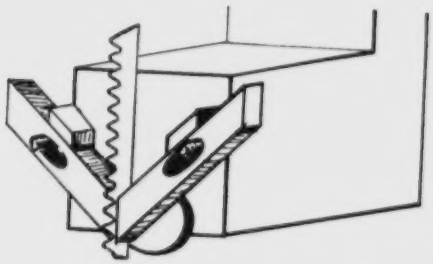
Friction guide
Roller guide
Roller guide
Friction guide





a. _____ b. _____

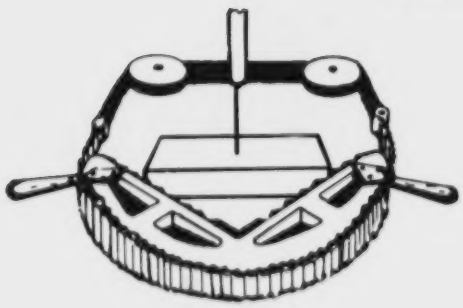




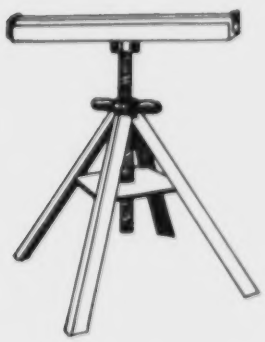
c. _____ d. _____

9. Identify accessories used with power saws shown in the following illustrations. Write the correct names in the blanks.

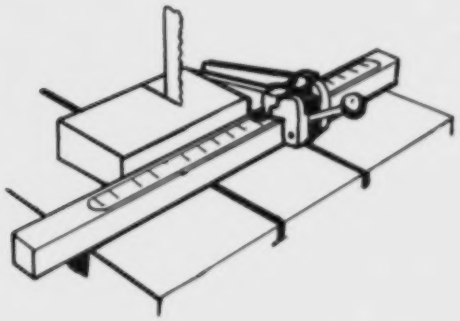
Workpiece fixture
Universal fence
Work support
Workholding jaws with feed chain and cable
Cut-off gage or stop



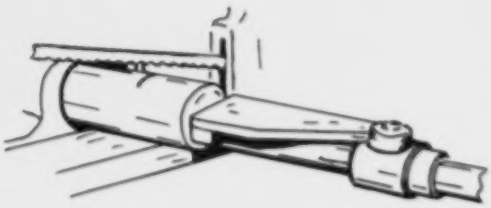
a. _____



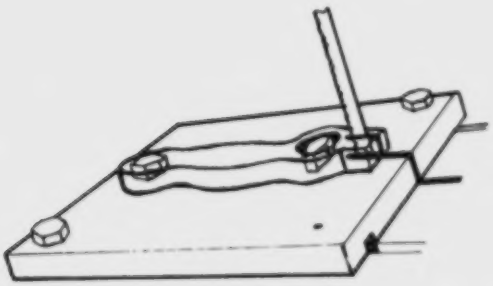
b. _____



c. _____



d. _____



e. _____

10. List methods for determining band saw speeds for different materials. Place an "X" beside each correct method.

_____a. Use the formula CS = $\frac{\text{Blade width x 4}}{\text{Thickness of material}}$

_____b. Machinist's handbook

_____c. Job selector dial on saw

_____d. Ask your instructor

11. List factors that determine saw blade selection by completing the following words.

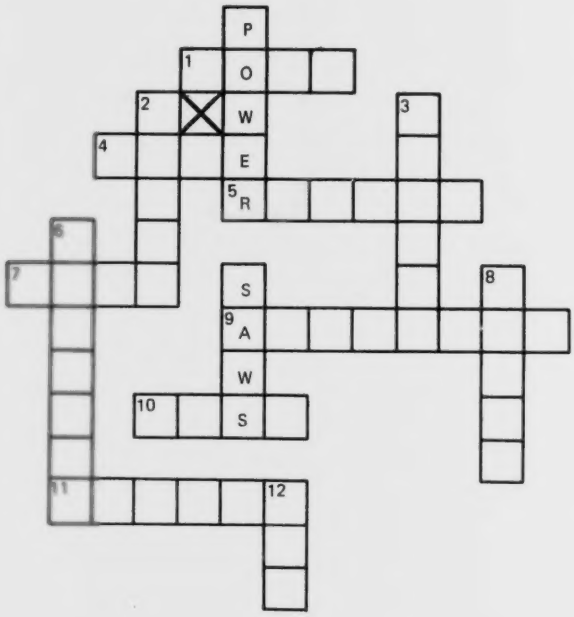
a. M_____

b. T_____ of m_____

c. T_____ of j_____

d. W_____ of b_____

12. Discuss care and cleaning of power saws by completing the following crossword puzzle.



a. Lubrication -- All grease fittings and oil levels should be checked (2 Down)

b. Brushes -- Brushes that clean the chips from the blade should be replaced when (1 Across) or the chips will eat up the (5 Across) on the (3 Down) of the band saw

c. Coolant tank -- Should be cleaned of chips and new coolant put in tank every two or three (8 Down)

d. Chips -- Clean chips from (4 Across) and wheel (11 Across) daily

e. Blade -- Check blade for (12 Down) and (6 Down) teeth before using

f. Table -- Clean vertical band saw table and wipe with light (7 Across) cloth to prevent (10 Across)

g. Guides -- Check guides and rollers frequently to make sure they are properly (9 Across) and working

13. List reasons for welding a band saw blade by placing an "X" beside each correct reason.

____a. It is more economical to buy band saw blade material in 100 or 500 foot rolls and then cut it and make your own bands

_____b. This is the only way to get exact blade tension

_____c. To be able to cut material out of the interior of a part without having to cut through the exterior material

_____d. To repair a blade that has broken or has teeth stripped out by welding or cutting out damaged portion and welding in a new section

_____e. To strengthen areas of saw blade material which appear to be weak

_____f. To be able to fit blade over pulleys at extreme positions of adjustment

14. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

_____I
_____II
_____III
_____IV
_____V
_____VI
_____VII
_____VIII
_____IX
_____X
_____XI
_____XIV
_____XV

If any of the above areas is checked, study the required information and continue to LAP Step 4. Otherwise, proceed to LAP Step 5.

POWER SAWS

UNIT I

LAP ASSIGNMENT SHEET #2--POWER SAWS

NAME_____ SCORE_____

1. Define the following terms associated with power saws.

a. Circumference -- _____

_____

b. Coiling -- _____

_____

c. Contouring -- _____

_____

d. Cutting speed -- _____

_____

e. Fixture -- _____

_____

f. Friction sawing -- _____

_____

g. Gullet -- _____

_____

h. Kerf -- _____

_____

i. Pitch -- _____

_____

j. Set -- _____

_____

2. Describe each of the following types of power saws.

   a. Reciprocating hacksaw -- _____

   _____

   _____

   b. Horizontal band saw -- _____

   _____

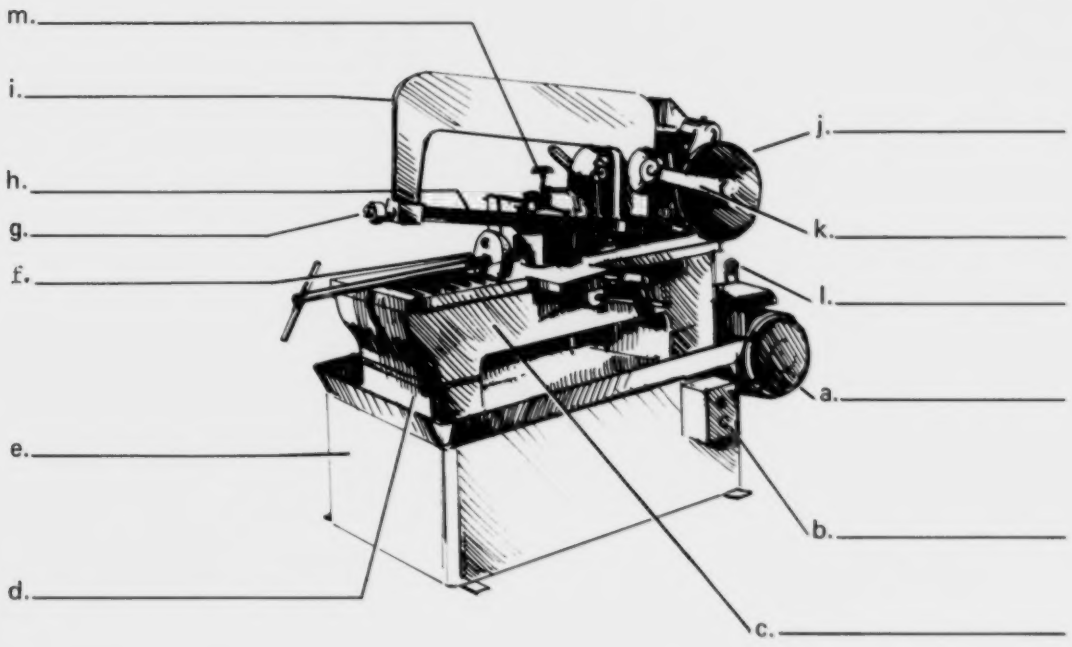
   _____

   c. Vertical band saw -- _____

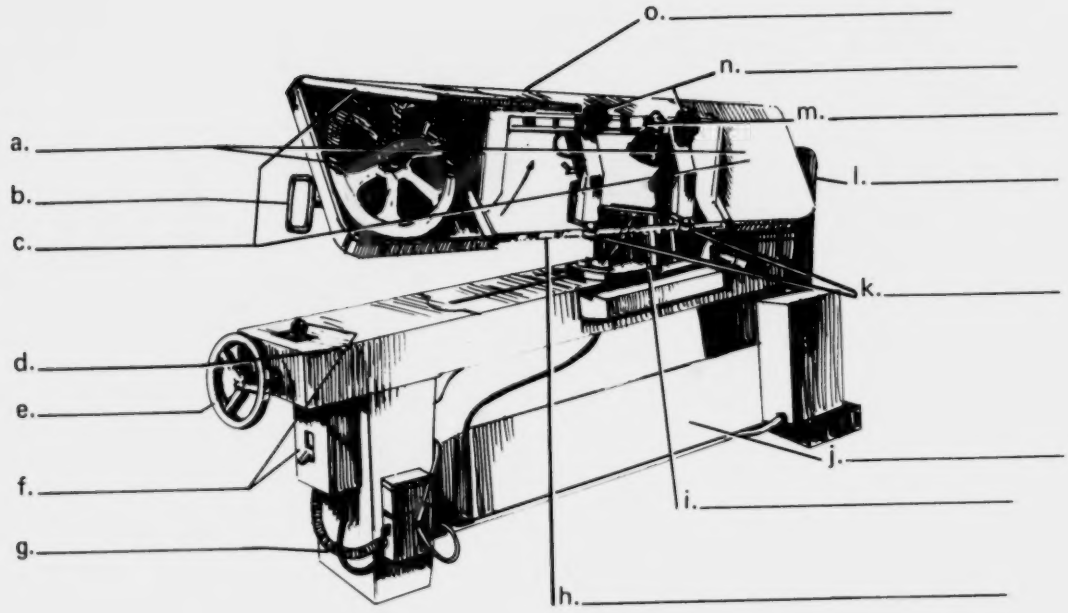
   _____

   _____

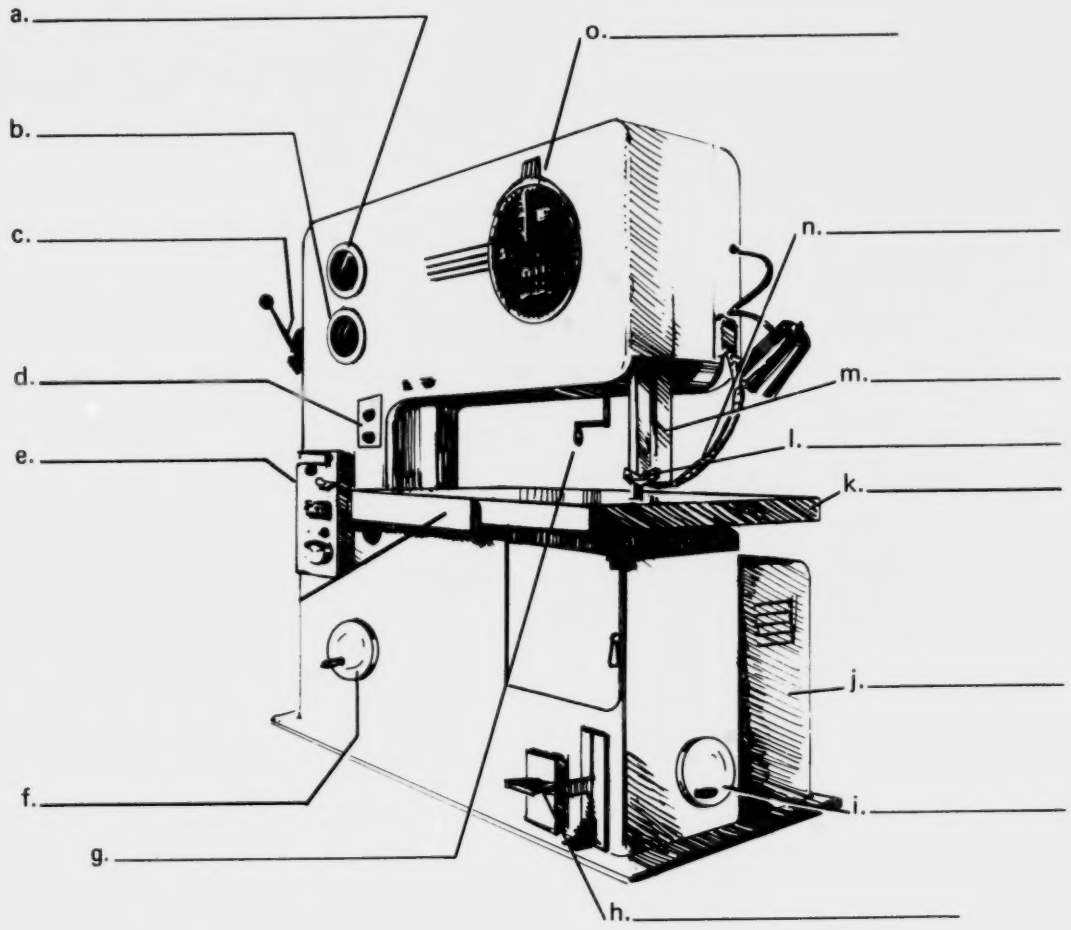
3. Identify major parts of a reciprocating hacksaw. Write the correct names in the blanks provided.



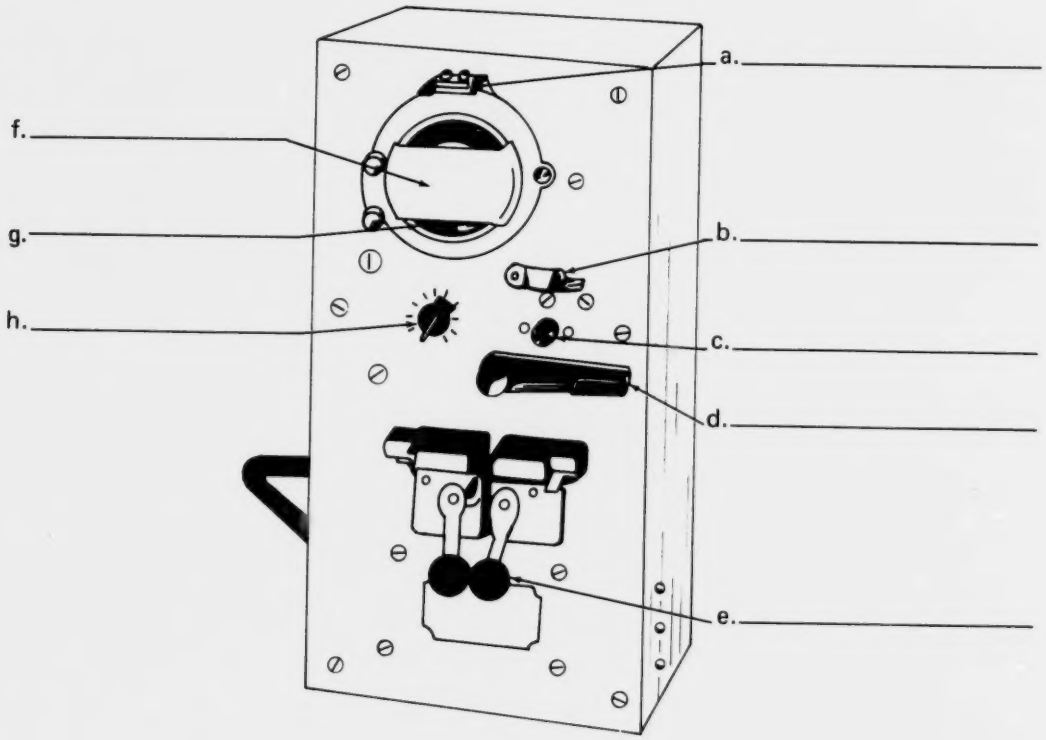
4. Identify major parts of a horizontal band saw. Write the names in the blanks provided.



5. Identify the major parts of a vertical band saw. Write the correct names in the blanks provided.



6. Identify the major parts of the butt welder. Write the correct names in the blanks.



7. Tell what kind of saw can be used for each of the following power saw operations.

   a. Filing:

      1)

      2)

   b. Square cutting

      1)

      2)

   c. Angular cutting:

      1)

      2)

   d. Contouring

      1)

      2)

   e. Stack cutting:

      1)

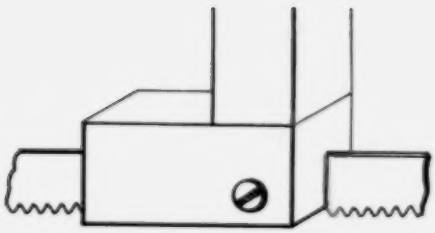
      2)

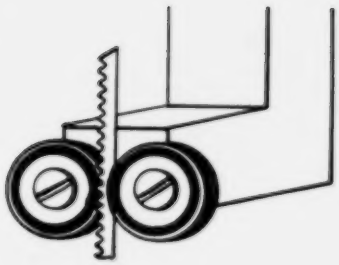
   f. Fixture work:

      1)

      2)

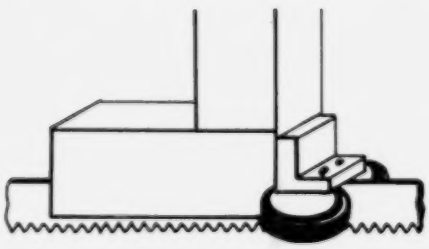
8. Identify types of blade guides seen in the illustrations below. Write the correct names in the blanks.

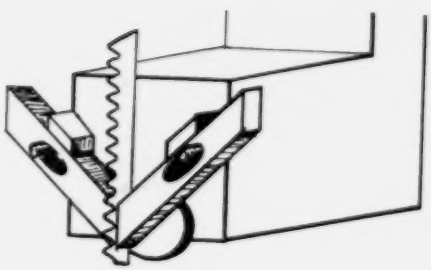




a. _____

b. _____



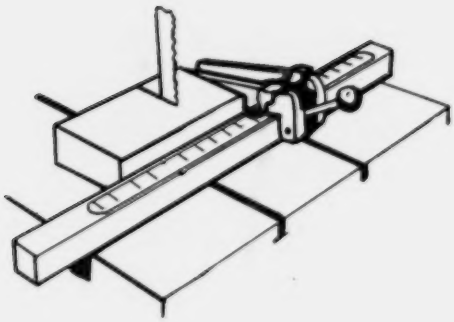


c. _____

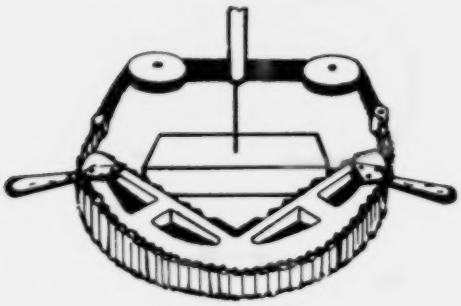
d. _____

9. Identify accessories used with power saws shown in the following illustrations. Write the correct names in the blanks.

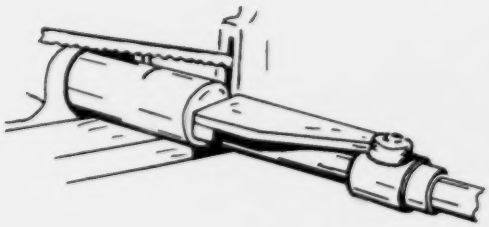
a. _____



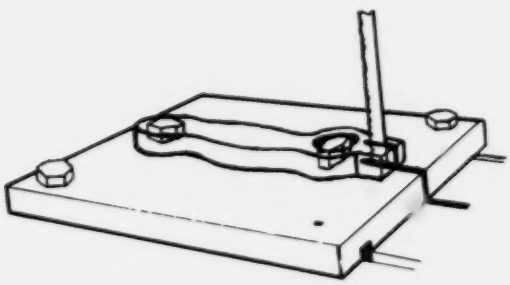
b. _____



c. _____



d. _____



e. _____

10. List methods for determining band saw speeds for different materials.

    a. _____

    b. _____

11. List factors that determine saw blade selection.

    a. _____

    b. _____

    c. _____

    d. _____

12. List seven considerations in the care and cleaning of power saws.

    a. _____

    _____

    b. _____

    _____

    c. _____

    _____

    d. _____

    _____

    e. _____

    _____

    f. _____

    _____

    g. _____

    _____

13. State reasons for welding a band saw blade.

    a. _____

    _____

b. _____

_____

c. _____

_____

14. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 7. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 7.

POWER SAWS

UNIT I

LAP ASSIGNMENT SHEET #3--COMPLETE POWER SAW SAFETY TEST

NAME_____ SCORE_____

1. Explain how each of the following words or terms apply to power saw safety.

   a. Covers and guards -- _____

   _____

   _____

   b. Hands -- _____

   _____

   _____

   c. Upper guide -- _____

   _____

   _____

   d. Eyes -- _____

   _____

   _____

   e. Machine controls -- _____

   _____

   _____

   f. Saw blade -- _____

   _____

   _____

   g. Scraps -- _____

   _____

   _____

h. Pusher -- _____

_____

_____

i. Broken parts or improper operation -- _____

_____

_____

j. Power -- _____

_____

_____

k. Frame lock -- _____

_____

_____

l. Blade -- _____

_____

_____

m. Feed -- _____

_____

_____

n. Long bars -- _____

_____

_____

o. Chip screen -- _____

_____

_____

p. Bending -- _____

_____

_____

q. Burrs -- _____

_____

_____

2. Stop. Have your instructor evaluate your Safety Test. If you score 100 percent, continue to LAP Step 11. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 11.

POWER SAWS

UNIT I

LAP ASSIGNMENT SHEET #4--CALCULATE STOCK LENGTHS

NAME_____ SCORE_____

1. An operation requires producing 31 workpieces 10" long. The saw kerf is 3/32" per cut.

   a. How much total stock is required? _____

   b. How many 12' bars are required? _____

2. During the production of 19 workpieces 8 1/4" long, each cut removes 1/8" of stock.

   a. How much total stock is required? _____

   b. How much stock will remain from a 12' bar? _____

3. To allow for future machining a machine shop always adds 1/4" to its cut stock. Sixty-eight machined parts are required. The saw kerf is 1/16".

   a. How much total stock is required? _____

   b. How many 12' bars are required? _____

   c. How much stock will be left from the 12' bars? _____

4. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 15. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 15.

POWER SAWS

UNIT I

LAP ASSIGNMENT SHEET #5--SELECT SAW BLADE FOR DIFFERENT JOBS

NAME_____ SCORE_____

1. State the number of teeth per inch recommended for the following thicknesses of materials.

_____a. 3 1/2"

_____b. 3/8"

_____c. 9/16"

_____d. 1 3/16"

_____e. 5/16"

2. State the tooth shape recommended for the following materials.

_____a. Used to cut high carbon steel bar

_____b. Used to cut Teflon sheets

_____c. Used to cut machine steel

_____d. Used to cut aluminum plate

_____e. Used to cut brass bar

_____f. Used to cut cast steel

_____g. Used to cut wood

_____h. Used to cut tempered aluminum

3. Name the type of set recommended for the following materials.

_____a. Used on a horizontal band saw to cut angle iron

_____b. Used on a horizontal band saw to cut pipe

_____c. Used on a vertical band saw to cut profiles

_____d. Used to cut wood

_____e. Used to cut contours with a vertical band saw

4. Complete the information for each job described below.

   a. 1 3/4" brass bar to be cut into 10 parts 5" long using a horizontal band saw

      _____ Number of teeth

      _____ Tooth shape

      _____ Set of tooth

   b. Cut a 2 1/4" diameter circle in 9/16" tempered aluminum plate on the vertical band saw

      _____ Number of teeth

      _____ Tooth shape

      _____ Set of tooth

      _____ Width of blade

   c. Cut a scallop pattern with a 1 1/2" radius in 1/4" cast steel plate on a vertical band saw

      _____ Number of teeth

      _____ Tooth shape

      _____ Set of tooth

      _____ Width of blade

5. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 19. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 19.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for MACHINE SHOP I

LAP NO._____ CODE:_____

MAJOR INSTRUCTIONAL AREA

POWER SAWS AND DRILLING MACHINES

INSTRUCTIONAL UNIT

DRILL PRESS
SECTION D--UNIT II

LEARNING ACTIVITY PACKET NO.

14

PREREQUISITE LAP(S)

1, 2, 3, 4, 5

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance tasks for "Drill Press." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a SKILLED or MODERATELY SKILLED competency level in the performance of jobs associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to identify drilling machines and operations and to safely perform those operations with the correct speeds and feeds.

TASKS INCLUDED IN THIS LAP:

1. Drill and ream holes to layout.
2. Countersink and counterbore holes to specifications
3. Tap holes using the drill press.

POWER SAWS AND DRILLING MACHINES
SECTION D--UNIT II

LEARNING STEPS

Check the Following
Blanks as You Complete
Each Required Step

_____1.	Read	Unit and Specific Objectives, page 87-D.
_____2.	Complete	Drill Press Pre-Test, Lap page 7.
_____3.	Study	The sections of the Information Sheet, pages 91-D through 102-D, indicated by your instructor on your Pre-Test. Be sure to study the Transparency Masters when required.
_____4.	Refer	To Step 17 of your Pre-Test. If additional study is indicated for any of sections I, II, III, IV, V, VI, VII, VIII, IX, X, XII, XIII, or XIV, continue to Step 5. Otherwise, proceed to LAP Step 7.
_____5.	Do	LAP Assignment Sheet #1, LAP page 27.
_____6.	Do	LAP Assignment Sheet #2, LAP page 41.
_____7.	Refer	To Step 17 of your Pre-Test. If additional study is indicated for Drill Press Operations, continue to Step 8. Otherwise, proceed to Step 11.
_____8.	Do	Assignment Sheet #1--Identify Drill Press Operations, page 125-D.
_____9.	Stop.	Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, proceed to Step 11. Otherwise, continue to Step 10.

_____10. Do — LAP Assignment Sheet #3, LAP page 55.

_____11. Refer — To Step 17 of your Pre-Test. If additional study is indicated for Section XI, continue to Step 12. Otherwise, proceed to Step 15.

_____12. Do — Assignment Sheet #2--Write Safety Rules for Safe Use of Drilling Machines, page 129-D.

_____13. Stop. — Have your instructor evaluate your Assignment Sheet. If you score 100 percent, proceed to Step 15. Otherwise, continue to Step 14.

_____14. Do — LAP Assignment Sheet #4, LAP page 57.

_____15. Refer — To Step 17 of your Pre-Test. If additional study is indicated for Section XV, continue to Step 16. Otherwise, proceed to Step 19.

_____16. Do — Assignment Sheet #3--Calculate Speeds and Feeds for Drilling Operations, page 133-D.

_____17. Stop. — Have your instructor evaluate your work. If your instructor is satisfied with your performance, proceed to Step 19. Otherwise, continue to Step 18.

_____18. Do — LAP Assignment Sheet #5, LAP page 61.

_____19. Check — The tasks below that you feel that you can do without supervision.

Student Check		Instructor Initials/Date	
		Skilled	Moderately Skilled
_____a.	Drill and ream holes to layout (22).	_____	_____
_____b.	Countersink and counterbore holes to specification (28).	_____	_____
_____c.	Tap holes using the drill press (34).	_____	_____

_____20. Discuss Your competency in each task with your instructor. Your instructor will initial each task in which you demonstrate sufficient competency. If all tasks have been initialed, proceed to Step 40. Otherwise, continue to Step 21.

_____21. Refer To Step 19a. If this task has been initialed, proceed to Step 27. Otherwise, continue to Step 22.

_____22. Study Job Sheet #1--Drill and Ream Holes to Layout, page 139-D.

_____23. Watch Slide/tape presentation "Drill and Ream Holes to Layout" (D-II-1).

_____24. Do Job Sheet #1--Drill and Ream Holes to Layout.

_____25. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19a and proceed to Step 27. Otherwise, repeat Steps 22-24 and then go to Step 26.

_____26. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19a and continue to Step 27. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 19a and continue to Step 27.

_____27. Refer — To Step 19b. If this task has been initialed, proceed to Step 33. Otherwise, continue to Step 28.

_____28. Study — Job Sheet #2--Countersink and Counterbore Holes to Specification, page 145-D.

_____29. Watch — Slide/tape presentation "Countersink and Counterbore Holes to Specification" (D-II-2).

_____30. Do — Job Sheet #2--Countersink and Counterbore Holes to Specification.

_____31. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19b and proceed to Step 33. Otherwise, repeat Steps 28-30 and then go to Step 32.

_____32. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19b and proceed to Step 33. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 19b and continue to Step 33.

_____33. Refer — To Step 19c. If this task has been initialed, proceed to Step 39. Otherwise, continue to Step 34.

_____34. Study — Job Sheet #3--Tap Holes Using the Drill Press, page 151-D.

_____35. Watch — Slide/tape presentation "Tap Holes Using the Drill Press" (D-II-3).

_____36. Do Job Sheet #3--Tap Holes Using the Drill Press.

_____37. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19c and proceed to Step 39. Otherwise, repeat Steps 34-36 and then go to Step 38.

_____38. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 19c and continue to Step 39. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 19c and continue to Step 39.

_____39. Refer To Step 19. If all tasks have been initialed, continue to Step 40. Otherwise, go to the step indicated in parentheses after the unsigned task.

_____40. Review The Information Sheet and Assignment Sheets.

_____41. Take Drill Press Unit II Test (see your instructor). If you score 85 percent or more, discuss further course work with your instructor. If you score less than 85 percent, discuss additional training and possible re-testing requirements with your instructor.

DRILL PRESS

UNIT II
PRE-TEST

NAME_____ SCORE_____

DIRECTIONS: This test is to determine how much you already know about the drill press. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you know the answer. Guessing may prevent you from receiving the lessons which are required.

1. Match terms associated with drill press operations to the correct definitions. Write the correct numbers in the blanks.

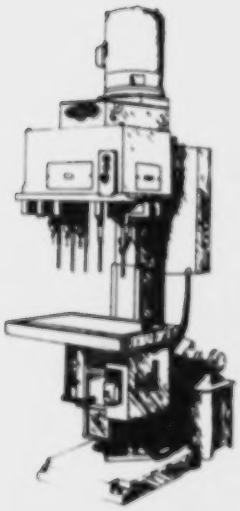
_____a.	Tapered portion of a cutting tool that aligns the tool in the spindle or holder	1.	Pilot hole
_____b.	Drills that are graduated from number 80 (.0135") to number 1 (.228"); sometimes referred to as wire gage size drills	2.	Center drilling
_____c.	Drills that can be adjusted from one diameter to a maximum	3.	Taper shank
_____d.	The amount of force put on a tool in the downward direction, expressed in feed per inch per revolution of the tool	4.	Straight shank
_____e.	Drills that are graduated from .35mm drills to 25mm and larger	5.	Number drills
_____f.	Straight portion of a cutting tool that aligns the tool in the holder	6.	Letter drills
_____g.	Flats or tongue machined on the end of a tapered shank to prevent the taper from rotating in the mating part	7.	Metric drills
_____h.	Shank with one flat side to allow chucking	8.	Fractional drills
_____i.	Small hole used to guide a drill of a larger size	9.	Tang
_____j.	Drills that are graduated from A (.234") to Z (.413")	10.	Feed pressure

_____k. Producing a small hole with a 60° taper at the top of the hole using a combination drill and countersink (center drill)

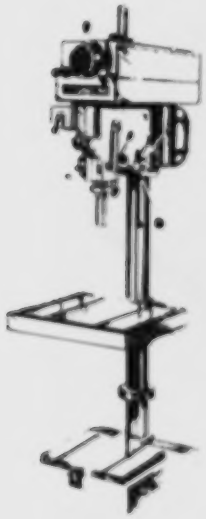
_____l. Pressure generated by a larger diameter bit on the side walls of a pilot hole

_____m. Drills that are graduated by fractions of inches from 1/64" to 1" and larger

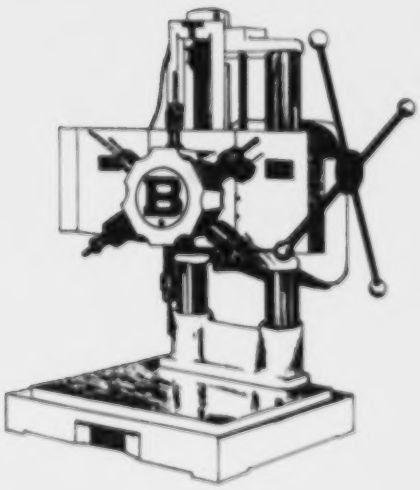
2. Identify types of drill presses seen in the following illustrations. Write the correct names in the blanks.



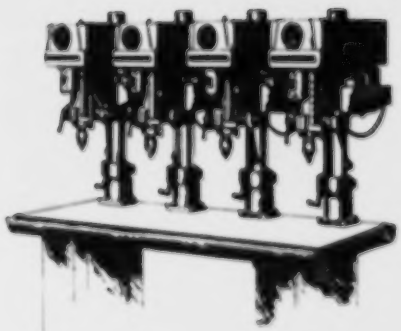
a. _____



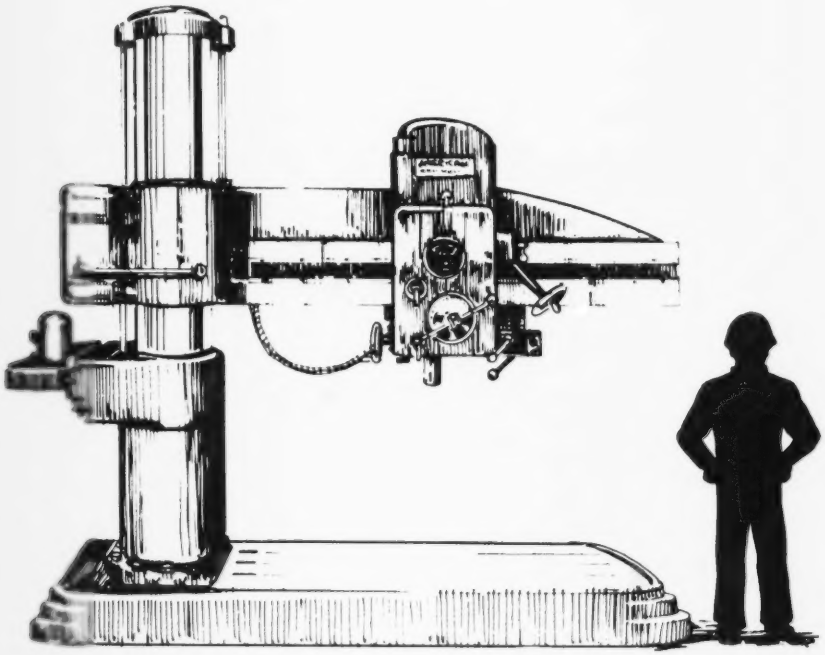
b. _____



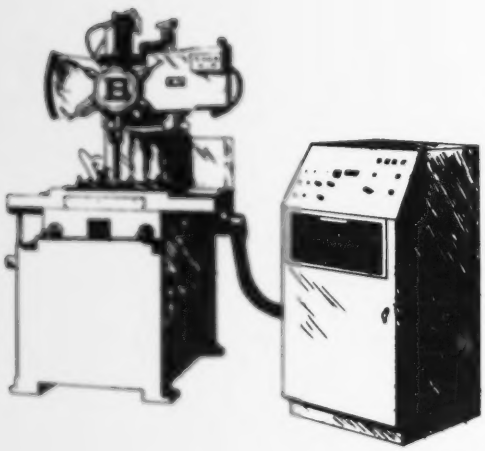
c. _____



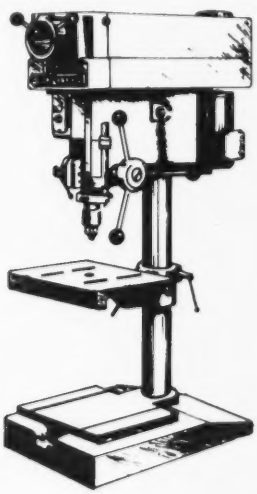
_____



e. _____



f. _____



g. _____

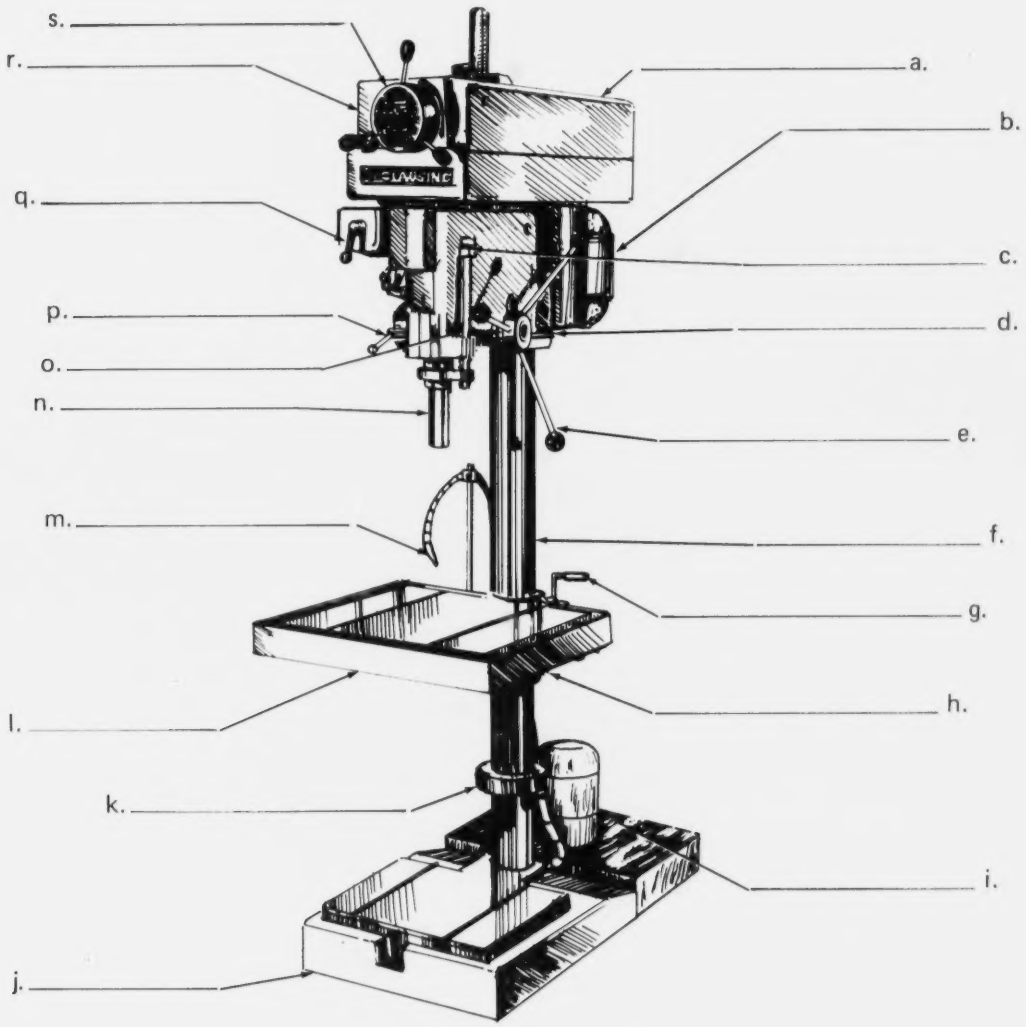
3. Describe the function of a drill press -- _____

_____

_____

_____

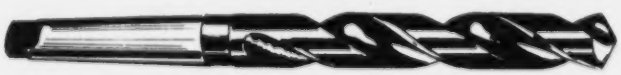
4. Identify major parts of a drill press. Write the correct names in the blanks.



5. Match operations performed on a drill press to the correct definitions. Write the correct numbers in the blanks.

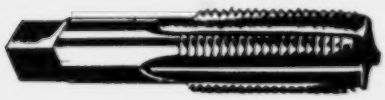
_____a.	Producing a screw thread in a hole that has been drilled to a specific size	1. Center drilling
_____b.	Producing a tapered surface in a hole so a flat head screw will be flush with the top surface of the part	2. Drilling
_____c.	Producing a hole of a given size and depth	3. Boring
_____d.	Enlarging a hole its full length to increase its diameter by a minimum of 75 percent	4. Counterboring
_____e.	Making a small angular surface at the top of a hole	5. Countersinking
_____f.	Making a flat surface so a bolt head or nut will seat properly	6. Tapping
_____g.	Making a hole with a tapered top so the drill will start in location desired	7. Spot facing
_____h.	Producing a tapered hole the full length of a pilot hole	8. Reaming
_____i.	Producing a small hole that is used to guide a larger drill and reduce the feed pressure of the larger drill	9. Chamfering
_____j.	Enlarging a hole with a flat bottom for a screw head to a set in below the surface	10. Drilling a pilot hole
_____k.	Enlarging a hole a small amount to make it true to size	
_____l.	Enlarging an existing hole to a given size and depth	
_____m.	Producing a slotted hole	

6. Name cutting tools used for drill press operations seen in the following illustrations. Write the correct names in the blanks.



a. _____

b. _____



c. _____

d. _____

e. _____

f. _____

g. _____

h. _____

i. _____

7. Describe types of drill press spindle drives.

a. Cone pulley drive -- _____

_____

_____

b. Variable speed drive -- _____

_____

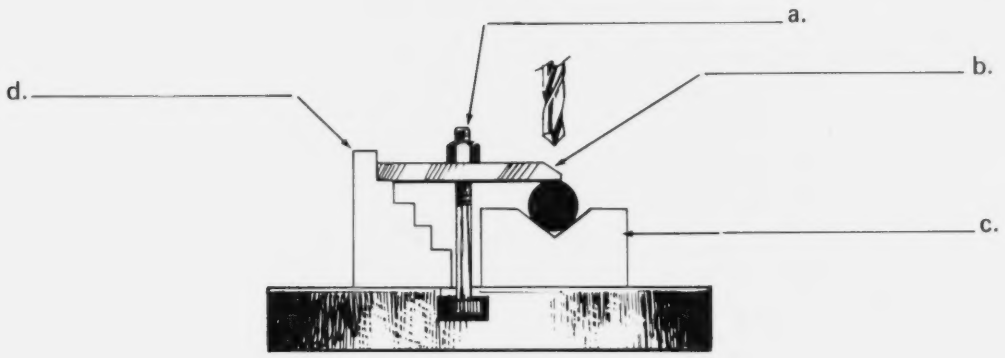
_____

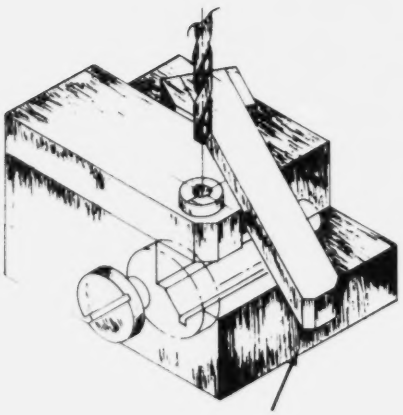
c. Gear head drive -- _____

_____

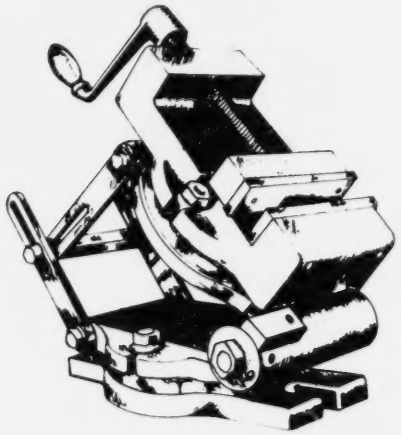
_____

8. Identify workholding and set-up devices used in drill press operations as seen in the following illustrations. Write the correct names in the blanks.

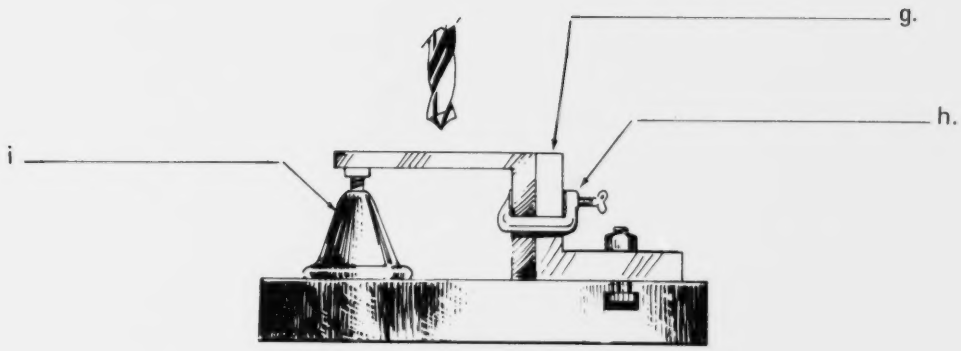


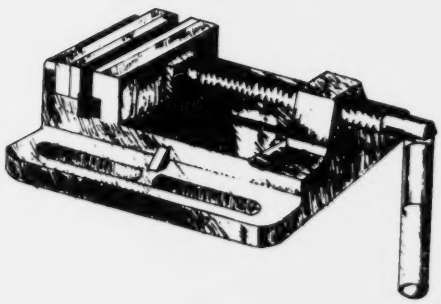


e. _____

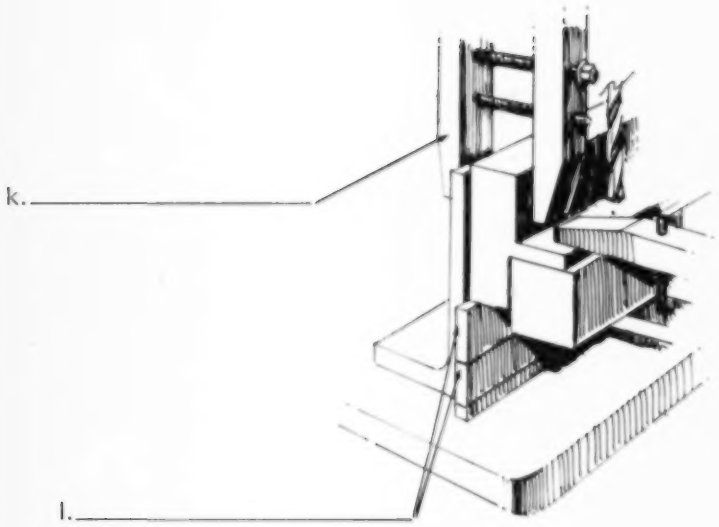


f. _____

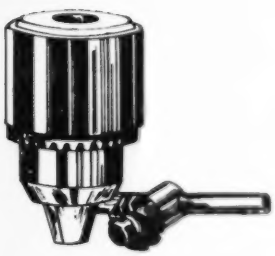


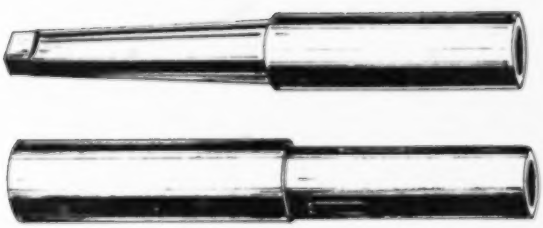


j. _____



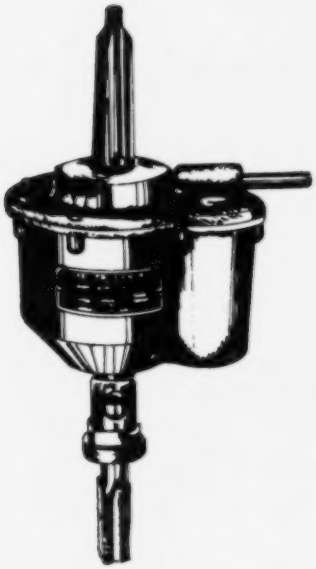
9. Identify attachments and accessories used with drill presses. Write the correct names in the blanks.





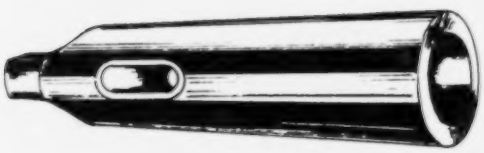
a. _____ b. _____

c. _____



d. _____

e. _____



f. _____

10. List three methods of applying coolants.

a. _____

b. _____

c. _____

11. State rules for safe use of drilling machines. Explain how the following words or phrases apply to drilling machine safety.

a. Eyes -- _____

_____

b. Clothing -- _____

_____

c. Guards -- _____

_____

d. Chuck key or drill drift -- _____

_____

_____

e. Watches and rings -- _____

_____

f. Chips -- _____

_____

g. Rags -- _____

_____

h. Work -- _____

_____

i. Feed pressure -- _____

_____

j. Drill chuck -- _____

_____

k. Drill drift -- _____

_____

l. Machine in motion -- _____

_____

m. Hands -- _____

_____

n. Table -- _____

_____

o. Spindle tapers -- _____

_____

p. Deep holes -- _____

_____

q. Chucks and other tools with tapered sharks -- _____

_____

r. Floor -- _____

_____

s. Drill press -- _____

_____

t. Tools -- _____

_____

u. Hair -- _____

_____

12. Discuss care and cleaning of drilling machines. Explain how the following words or phrases apply to care and cleaning of drilling machines.

a. Lubrication -- _____

_____

b. Belts -- _____

_____

c. Variable speed drives -- _____

_____

d. Gear drives -- _____

_____

e. Chips -- _____

f. Tools -- _____

_____

13. List factors that affect cutting speeds for drilling operations.

a. _____

b. _____

c. _____

14. Determine rpm for drilling using the following drill speed chart. Write your answers in the blanks provided.

High Speed Steel Drills									
Size of Drill	Feed per Rev.	Bronze, Brass, 300 Feet	Cast Iron, Annealed, 170 Feet	Cast Iron, Hard, 80 Feet	Mild Steel 120 Feet	Drop Forg., 60 Feet	Mal. Iron, 90 Feet	Tool Steel, 60 Feet	Cast Steel, 40 Feet
Ins.	Ins.	rpm	rpm	rpm	rpm	rpm	rpm	rpm	rpm
1/16	0.003	....	....	4880	....	3660	....	3660	2440
1/8	0.004	....	5185	2440	3660	1830	2745	1830	1220
3/16	0.005	....	3456	1626	2440	1210	1830	1220	807
1/4	0.006	4575	2593	1220	1830	915	1375	915	610
5/16	0.007	3660	2074	976	1464	732	1138	732	490
3/8	0.008	3050	1728	813	1220	610	915	610	407
7/16	0.009	2614	1482	698	1046	522	784	522	348
1/2	0.010	2287	1296	610	915	458	636	458	305
5/8	0.011	1830	1037	488	732	366	569	366	245
3/4	0.012	1525	864	407	610	305	458	305	203
7/8	0.013	1307	741	349	523	261	392	261	174
1	0.014	1143	648	305	458	229	349	229	153
1 1/4	0.016	915	519	244	366	183	275	183	122
1 1/2	0.016	762	432	204	305	153	212	153	102
1 3/4	0.016	654	371	175	262	131	196	131	87
2	0.016	571	323	153	229	115	172	115	77

a. 5/8" drill in mild steel with a CS of 120 feet

Answer:_____ rpm

b. 1/2" drill in aluminum plate with a CS of 300 feet

Answer: _____ rpm

15. Calculate drill speeds using rpm formula for the following drilling operations. Show your work. Write your answers in the blanks provided.

(NOTE: Assume all drills are high speed steel.)

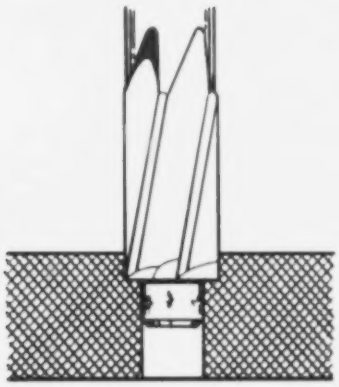
a. You are to drill a 9/16" hole in annealed cast iron with a cutting speed of 170 feet per minute. What rpm do you use?

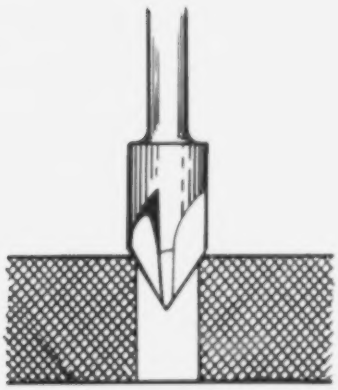
Answer: _____ rpm

b. You must drill four holes, each with a diameter of 7/8", in a cast steel plate, using a cutting speed of 40 feet per minute. What rpm should you use?

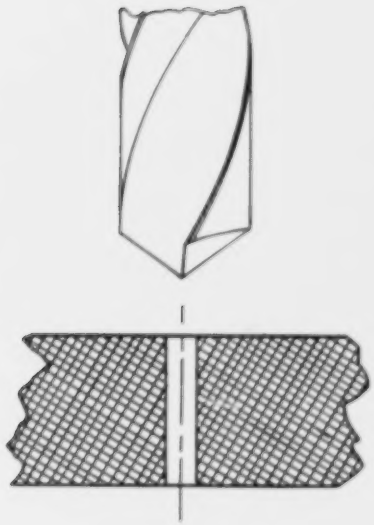
Answer: _____ rpm

16. Identify the following drill press operations. Place the names in the correct blanks.

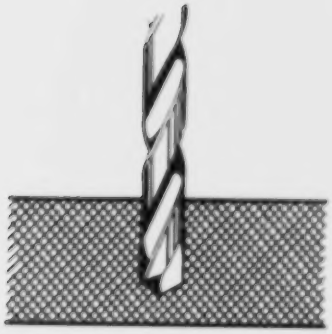




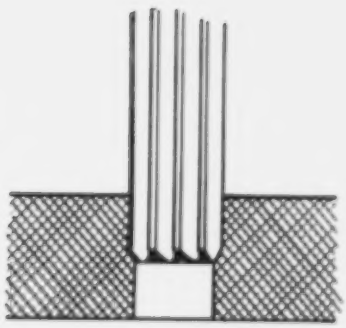
a. _____ b. _____



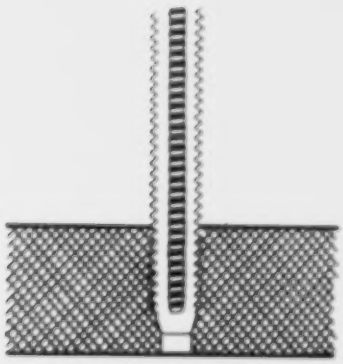
c. _____



d. _____

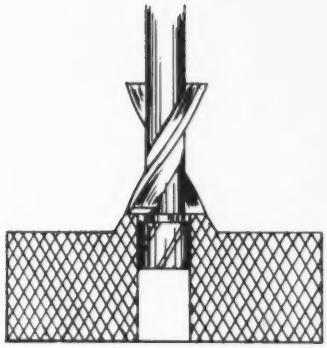


e. _____

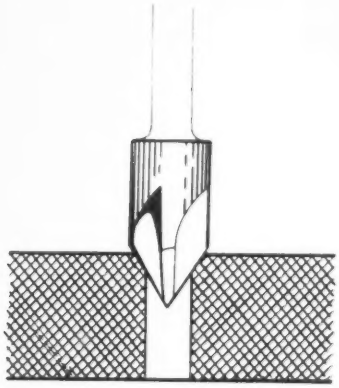


f. _____

g. _____



h. _____



i. _____

17. Stop. Have your instructor evaluate your Pre-Test and mark the areas which require additional study.

Refer to Information Sheet, Sections:

_____I	_____IX
_____II	_____X
_____III	_____XI
_____IV	_____XII
_____V	_____XIII
_____VI	_____XIV
_____VII	_____XV
_____VIII	_____Drill Press Operations

You came here from LAP Step 3. If any of the above study areas is checked, continue to LAP Step 3. Otherwise, proceed to LAP Step 19.

DRILL PRESS
UNIT II

LAP ASSIGNMENT SHEET #1--DRILL PRESS

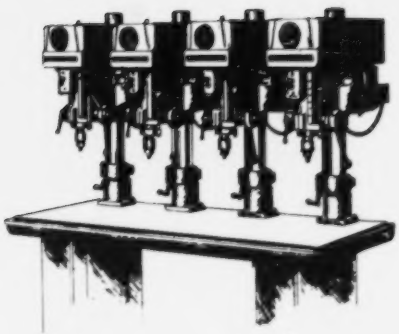
NAME_____ SCORE_____

1. Match the terms associated with drill press operations to the correct definitions. Write the correct numbers in the blanks.

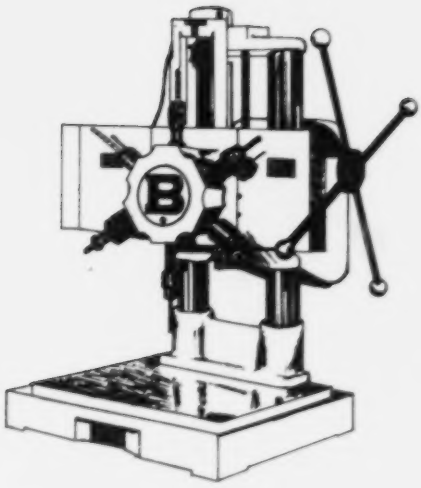
_____a.	Tapered portion of a cutting tool that aligns the tool in the spindle or holder	1.	Pilot hole
_____b.	Drills that are graduated from number 80 (.0135") to number 1 (.228"); sometimes referred to as wire gage size drills	2.	Center drilling
_____c.	The amount of force put on a tool in the downward direction, expressed in feed per inch per revolution of the tool	3.	Taper shank
_____d.	Drills that are graduated from .35mm to 25mm and larger	4.	Straight shank
_____e.	Straight portion of a cutting tool that aligns the tool in the holder	5.	Number drills
_____f.	Flats or tongue machined on the end of a tapered shank to prevent the taper from rotating in the mating part	6.	Letter drills
_____g.	Small hole used to guide a drill of a larger size	7.	Metric drills
_____h.	Drills that are graduated from A (.234") to Z (.413")	8.	Fractional drills
_____i.	Producing a small hole with a 60° taper at the top of the hole using a combination drill and countersink (center drill)	9.	Tang
_____j	Drills that are graduated by fractions of inches from 1/64" to 1" and larger	10.	Feed pressure

2. Identify types of drill presses seen in the following illustrations. Write the correct names in the blanks.

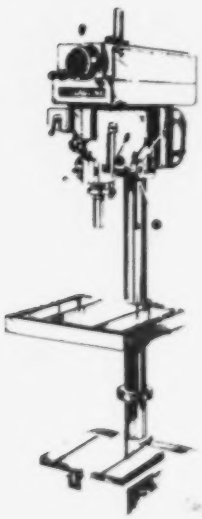
Sensitive bench drill press
Upright drill press
Radial arm drill press
Gang drill press
Multispindle drilling, boring and tapping machine
Bench turret drill press
Numerical control turret drilling and tapping machine



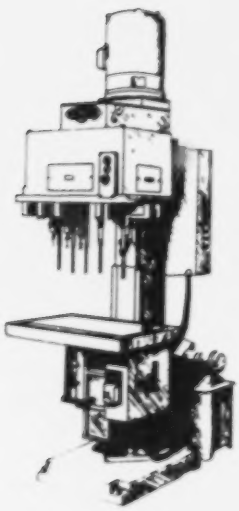
a. _____



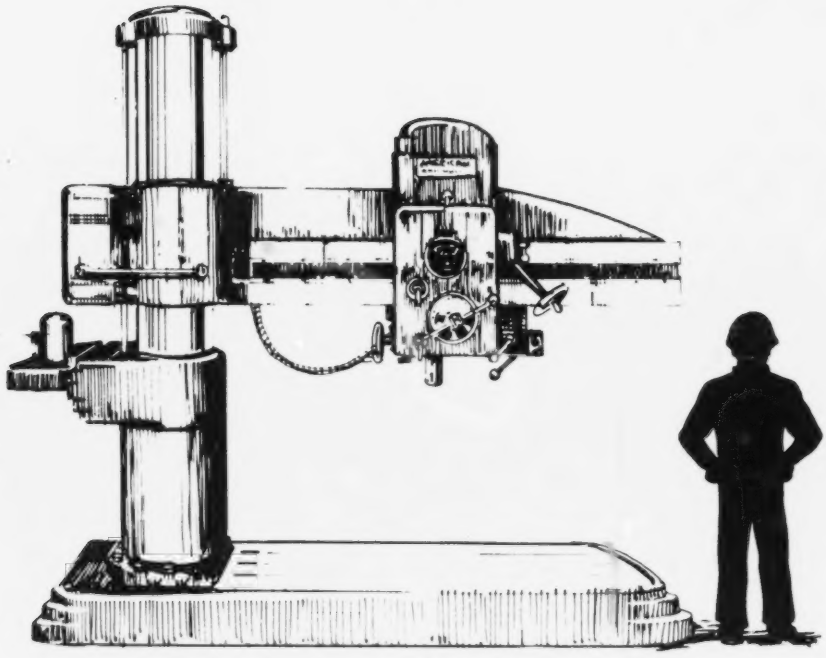
b. _____



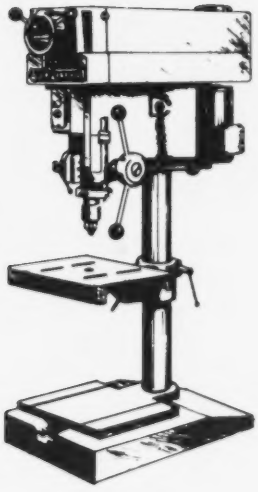
c. _____



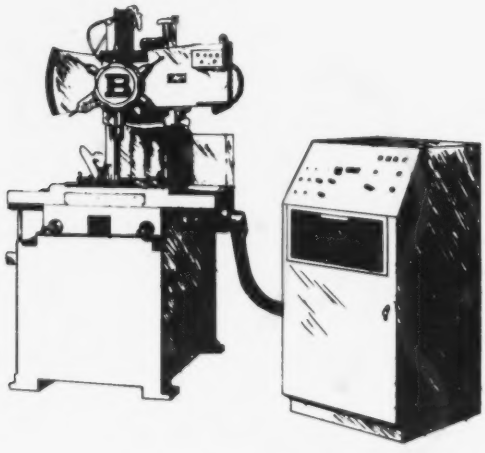
d. _____



e. _____



f. _____



g. _____

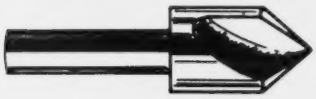
3. Describe the function of a drill press by completing the following statement.

   To produce _____ holes in material by using _____ _____ and other types of _____ _____.

4. Identify major parts of a drill press as seen on the next page. Write the correct numbers in the blanks.

1. Speed selector	10. Coolant pump
2. Head	11. Table locking bolts
3. Switch	12. Table elevating crank
4. Spindle lock	13. Column
5. Depth gage	14. Manual feed lever
6. Spindle	15. Feed drive
7. Coolant nozzle	16. Motor
8. Table	17. Belt guard
9. Table stop collar	18. Base
	19. Depth Stop

b. _____

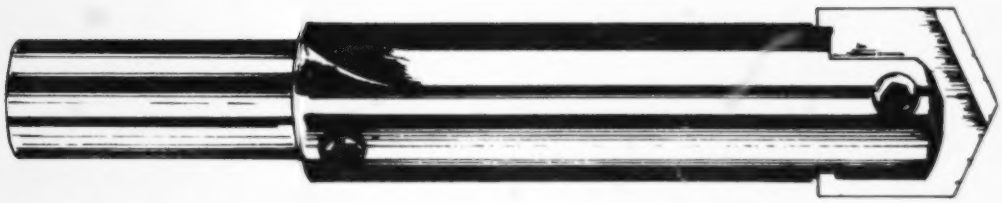


c. _____

d. _____

e. _____

f. _____



g. _____

h. _____

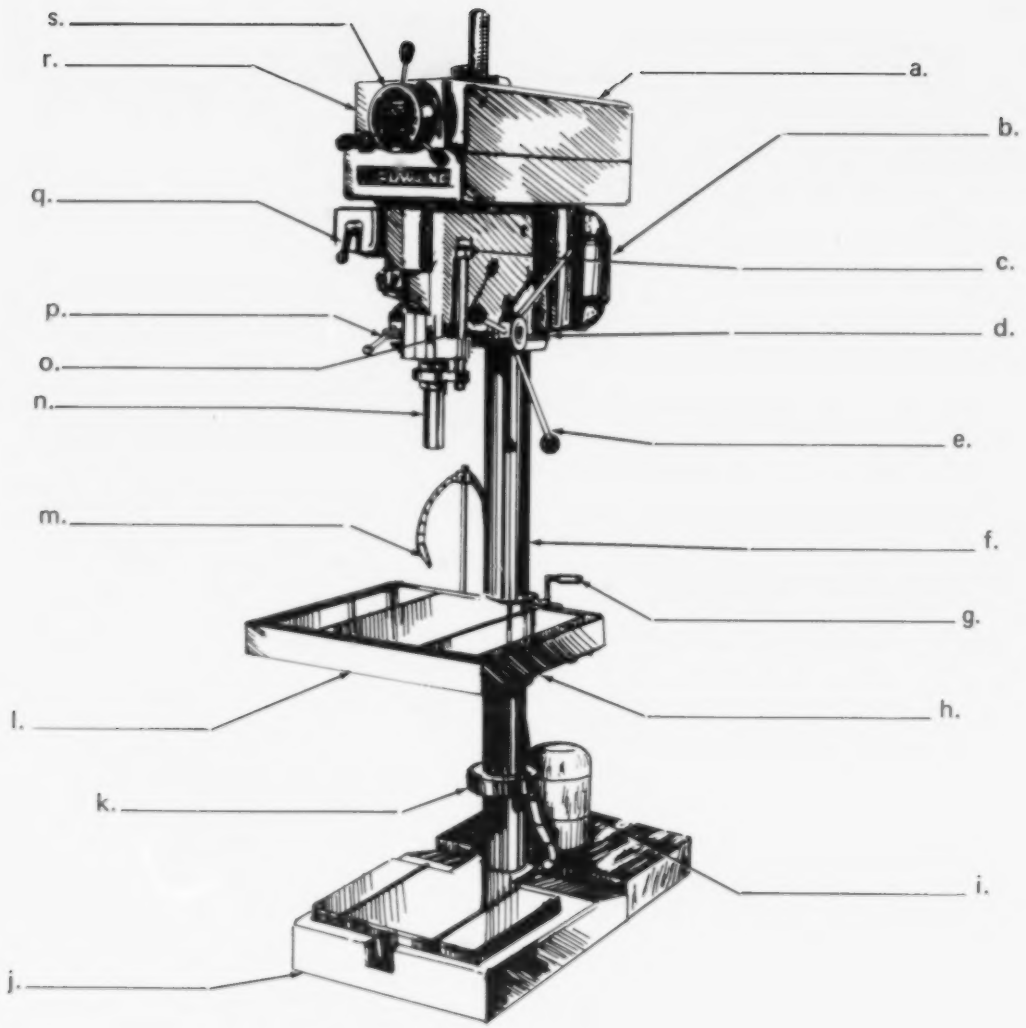
i. _____

7. Describe types of drill press spindle drives by completing the following statements.

   a. Cone pulley drive -- Found on _____ sensitive type _____ and _____ mounted machines; speeds are obtained by changing _____ position.

   b. Variable speed drive -- Found on sensitive type _____ mounted machines; speeds are obtained by _____ the _____ _____.

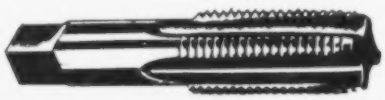
   c. Gear head drive -- Found on _____ mounted machines like _____ _____ and _____ drill presses; speeds are obtained by changing _____.


s.
r.
a.
b.
q.
c.
p.
d.
o.
n.
e.
m.
f.
g.
l.
h.
k.
i.
j.

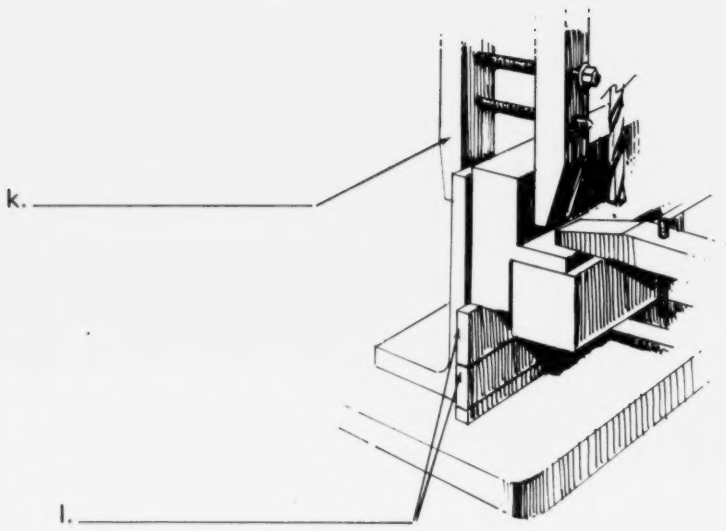
5. Match operations performed on a drill press to the correct definitions. Write the correct numbers in the blanks.

_____a.	Producing a screw thread in a hole that has been drilled to a specific size	1. Center drilling
_____b.	Producing a tapered surface in a hole so a flat head screw will be flush with the top surface of the part	2. Drilling
_____c.	Producing a hole of a given size and depth	3. Boring
_____d.	Making a small angular surface at the top of a hole	4. Counterboring
_____e.	Making a flat surface so a bolt head or nut will seat properly	5. Countersinking
_____f.	Making a hole with a tapered top so the drill will start in location desired	6. Tapping
_____g.	Producing a small hole that is used to guide a larger drill and reduce the feed pressure of the larger drill	7. Spot facing
_____h.	Enlarging a hole with a flat bottom for a screw head to set in below the surface	8. Reaming
_____i.	Enlarging a hole a small amount to make it true to size	9. Chamfering
_____j.	Enlarging an existing hole to a given size and depth	10. Drilling a pilot

6. Name cutting tools used in drill press operations as seen in the following illustrations. Write the correct names in the blanks.

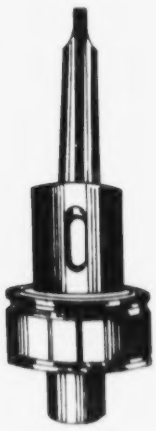


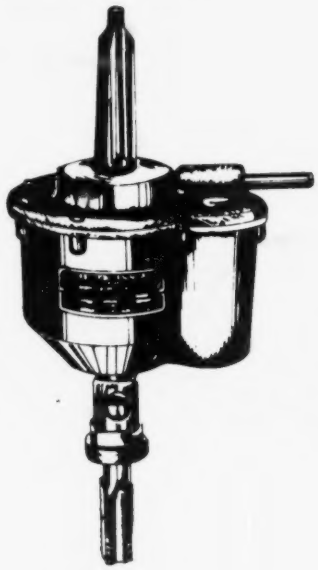
a. _____



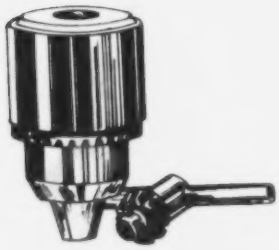
9. Identify attachments and accessories used with drill presses. Write the correct names in the blanks.

Tapping attachment	Steel sockets
Floating chuck	Drill chuck
Drill drift	Morse taper shank adapter sleeve

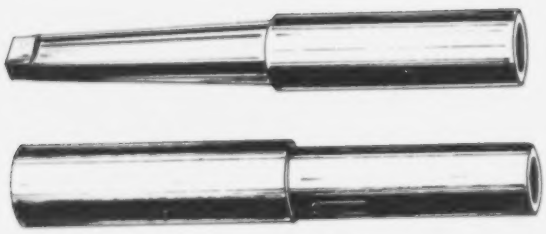




a. _____ b. _____

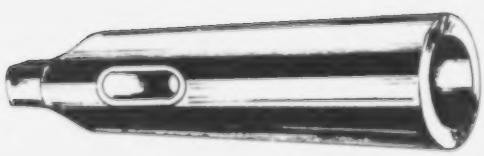


c. _____



d. _____

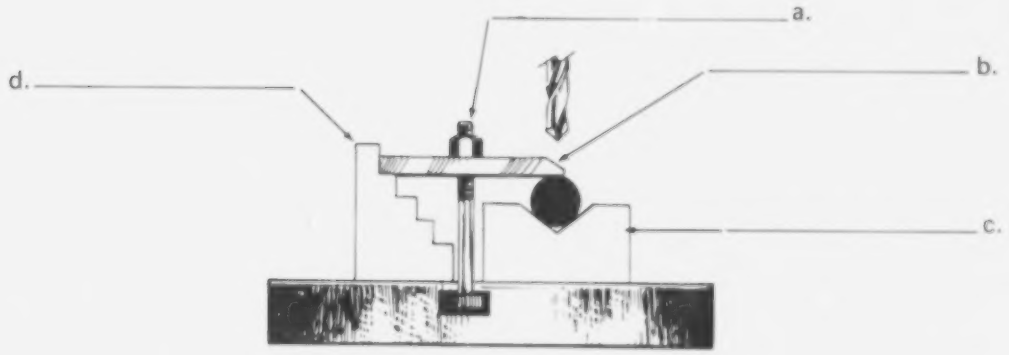
e. _____

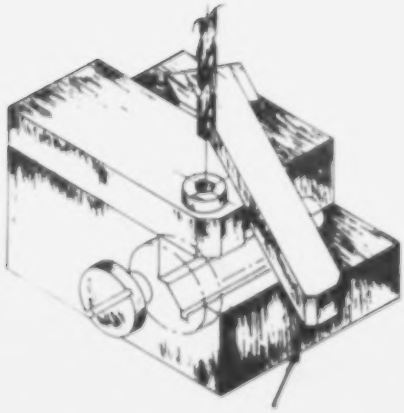


f. _____

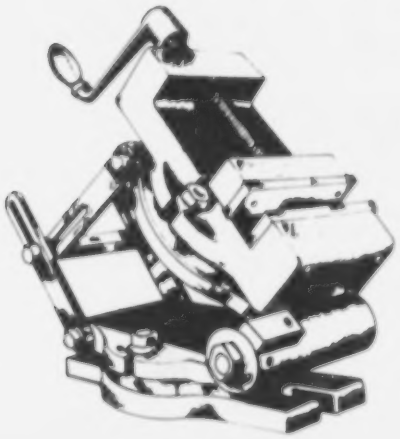
8. Identify workholding and set-up devices used in drill press operations as seen in the following illustrations. Write the correct names in the blanks.

Vise	Strap clamp	Parallels
Parallel clamp	Angle plate	Screw jack
C-clamp	V-block	
Drill fixture	Angle vise	
Step block	T-bolt	

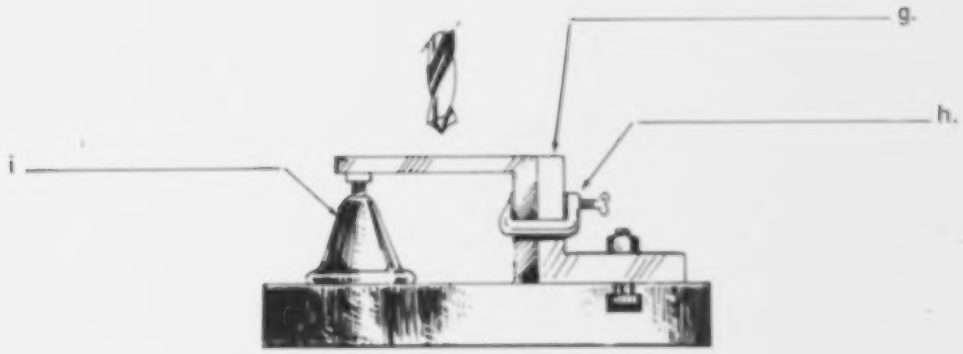


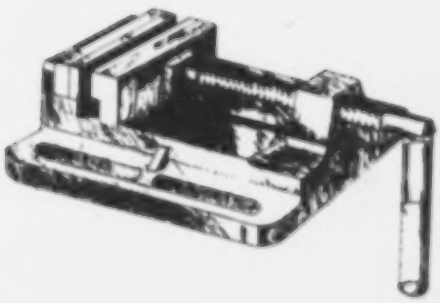


e. _____



f. _____





j. _____

DRILL PRESS
UNIT II

LAP ASSIGNMENT SHEET #2--DRILL PRESS

1. Define the following terms.

   a. Center drilling -- _____

   _____

   _____

   b. Feed pressure -- _____

   _____

   _____

   c. Fractional drills -- _____

   _____

   _____

   d. Letter drills -- _____

   _____

   _____

   e. Metric drills -- _____

   _____

   _____

   f. Number drills -- _____

   _____

   _____

   g. Pilot hole -- _____

   _____

   _____

h. Straight shank -- _____

_____

_____

i. Tang -- _____

_____

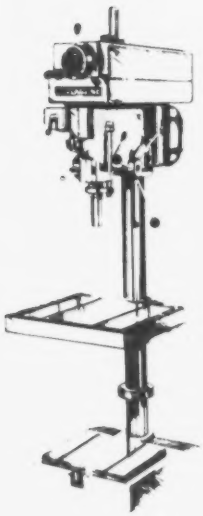
_____

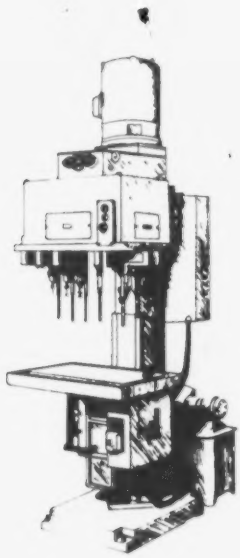
j. Taper shank -- _____

_____

_____

2. Identify the types of drill presses shown in the following illustrations.





a. _____ b. _____

10. List methods of applying coolant by placing an "X" beside each correct method below.

_____a. Oil can

_____b. Flood

_____c. Oil cloth

_____d. Oil spout

_____e. Spray mist

_____f. Measured dropper nozzle

_____g. Brush

11. Discuss the care and cleaning of the drill press. Each of the following statements has one or more incorrect words. Crossout the incorrect words and write a proper response in the blanks provided.

a. Lubrication -- Check all old levels for proper levels before using

_____

b. Belts -- Check dry belts for proper whiteness

_____ _____

c. Variable speed drives -- Never crank the seed deflector when spinner is not turning

_____ _____ _____

d. Gear drives -- Never shift gears when spittoon is turning; shut off machine

_____

e. Chips -- Clean chips off floor with a bush

_____ _____

f. Tools -- Never use a dumb tool since it causes more fractions and will ruin the tool

_____ _____

12. List three factors that affect cutting speeds for drilling operations. Complete the following words.

    a. D_____ s_____

    b. T_____ of m_____ to be drilled

    c. D_____ m_____

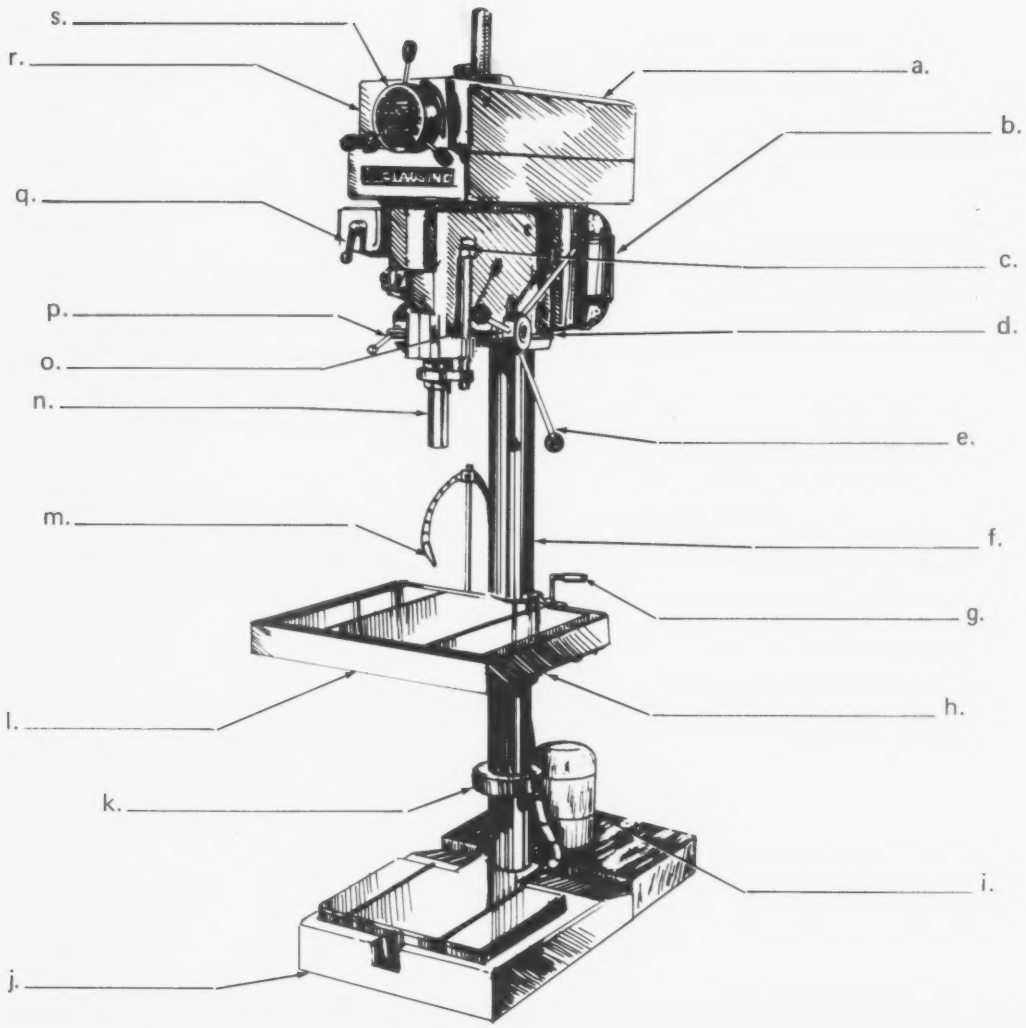
13. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below that require additional study.

    Refer to Information Sheet, Sections:

_____I	_____VII
_____II	_____VIII
_____III	_____IX
_____IV	_____X
_____V	_____XII
_____VI	_____XIII

    If any of the above areas is checked, study the required information and continue to LAP Step 6. Otherwise, proceed to LAP Step 7.

4. Identify the major parts of a drill press in the illustration below. Write the names in the blanks provided.



5. Describe the following operations performed on a drill press.

a. Center drilling -- _____

_____

_____

b. Chamfering -- _____

_____

_____

c. Counterboring -- _____

_____

_____

d. Countersinking -- _____

_____

_____

e. Drilling -- _____

_____

_____

f. Drilling a pilot hole -- _____

_____

_____

g. Reaming -- _____

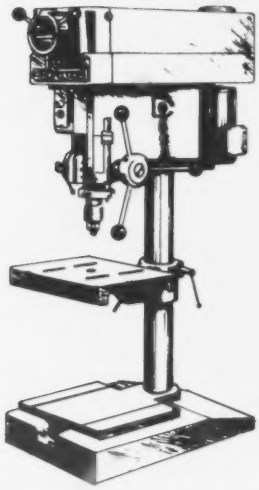
_____

_____

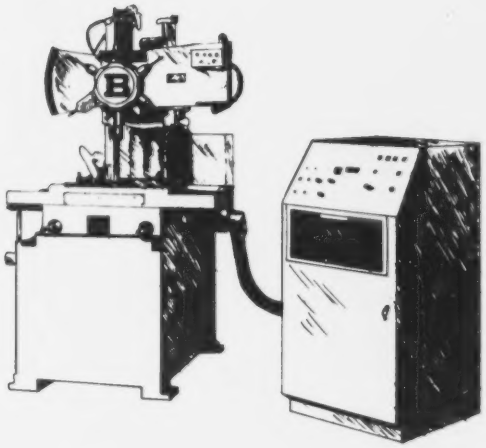
h. Spot facing -- _____

_____

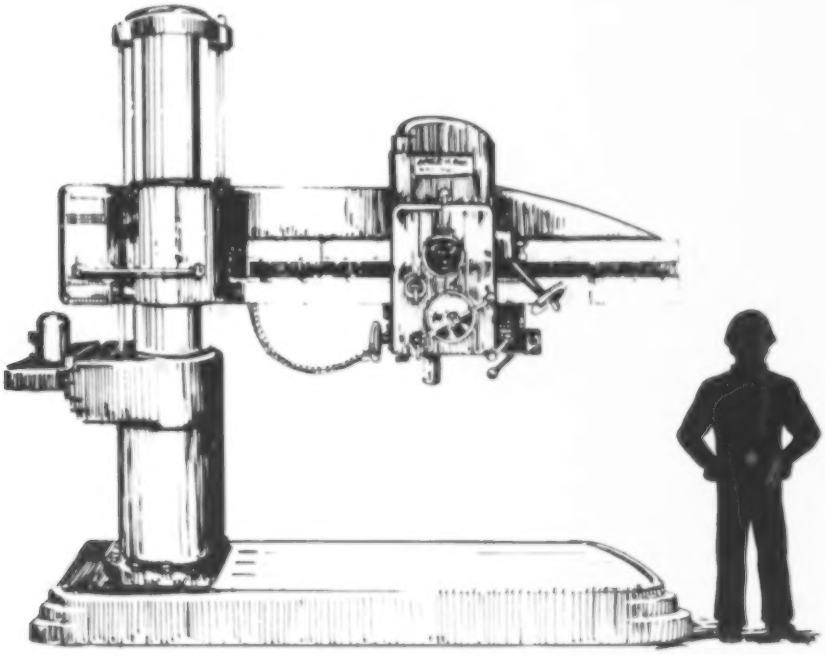
_____

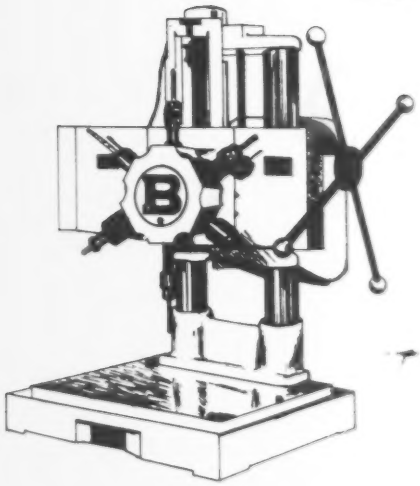


c. _____

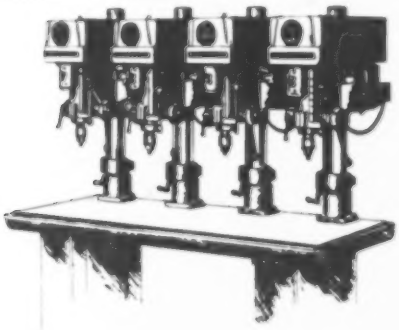


d. _____





e. _____



f. _____ g. _____

2. Describe the function of the drill press -- _____

_____

_____

_____

i. Tapping -- _____

_____

_____

j. Boring -- _____

_____

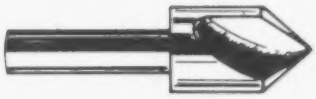
_____

6. Name cutting tools used for drill press operations in the following illustrations. Write the correct names in the blanks.

a. _____

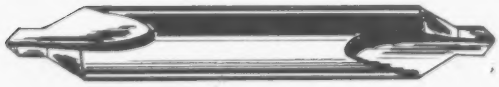
b. _____

c. _____

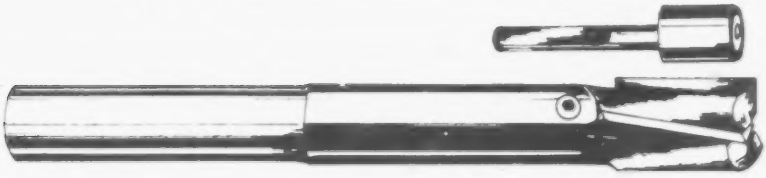


d. _____

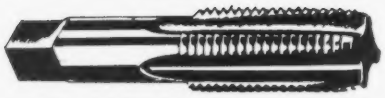
e. _____



f. _____



g. _____



h. _____

i. _____

7. Describe types of drill press spindle drives.

   a. Cone pulley drive -- _____

   _____

   _____

   b. Variable speed drive -- _____

   _____

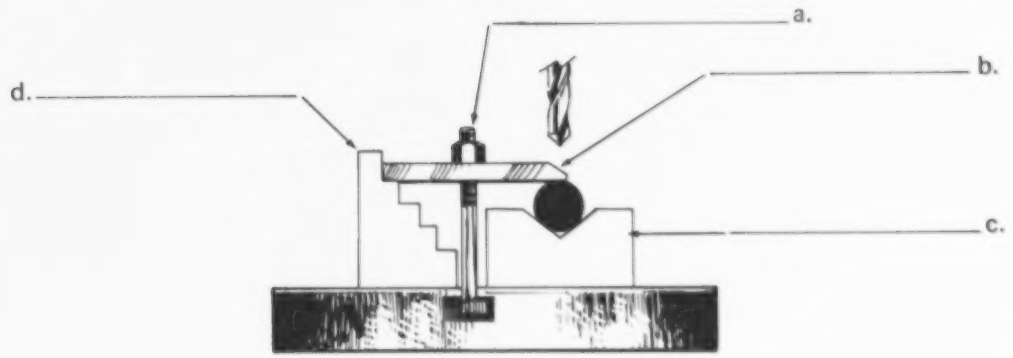
   _____

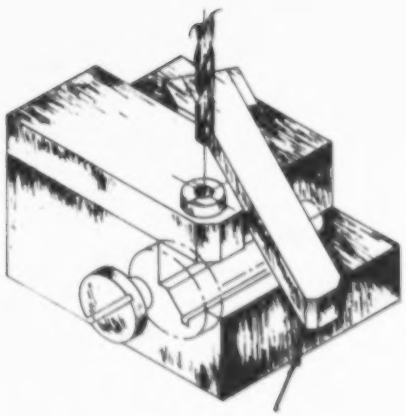
   c. Gear head drive -- _____

   _____

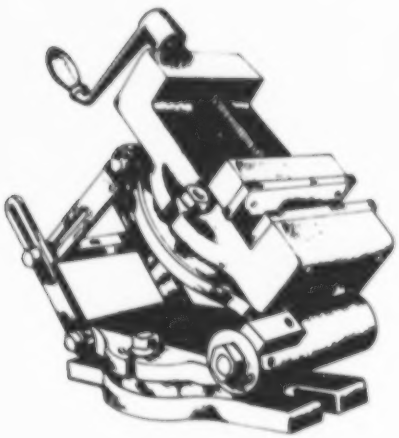
   _____

8. Identify workholding and set-up devices used in drill press operations as seen in the following illustrations. Write the correct names in the blanks.

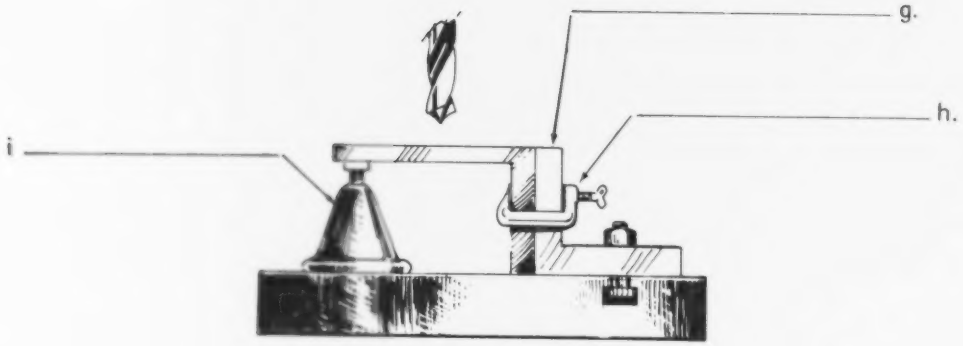


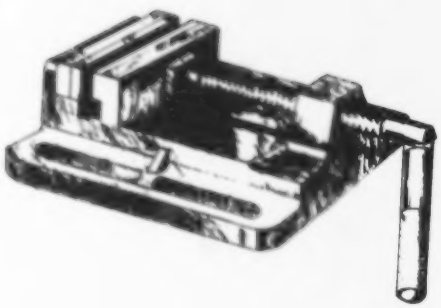


e. _____

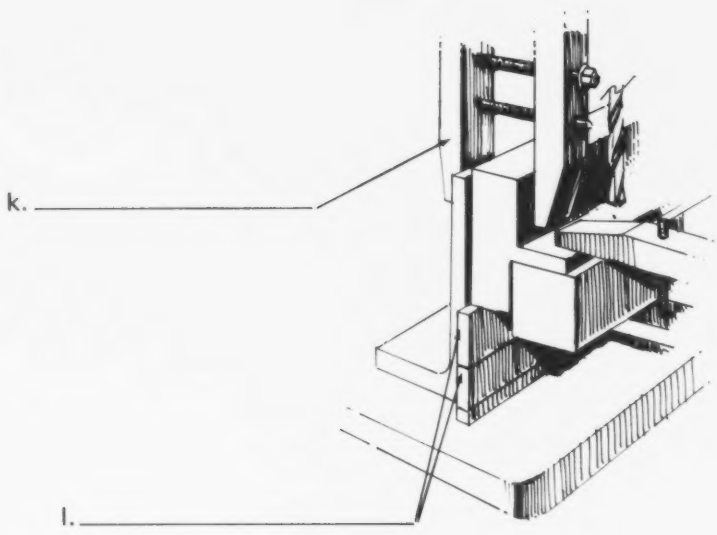


f. _____

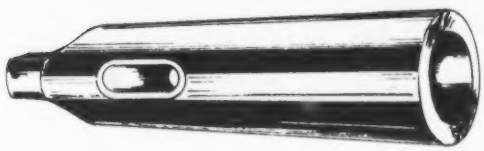




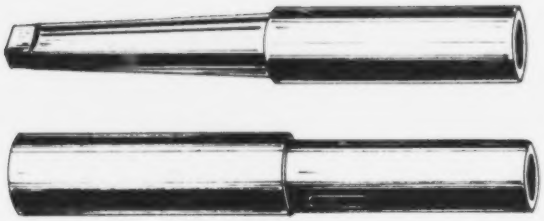
j. _____



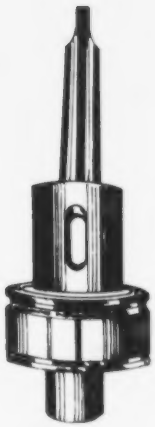
9. Identify attachments and accessories used with drill presses. Write the correct names in the blanks.



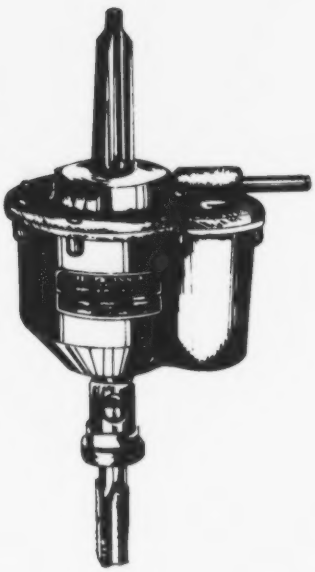
a. _____ b. _____

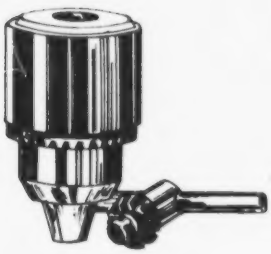


c. _____



d. _____





e. _____ f. _____

10. List three methods of applying coolants.

a. _____

b. _____

c. _____

11. List three factors that affect cutting speeds for drilling operations.

    a. _____

    b. _____

    c. _____

12. List four methods of applying coolant.

    a. _____

    b. _____

    c. _____

    c. _____

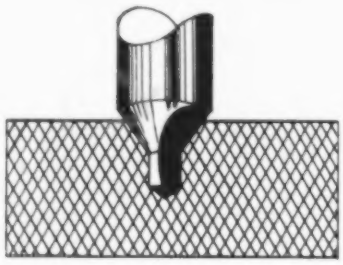
13. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 7. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satsfaction, continue to LAP Step 7.

DRILL PRESS
UNIT II

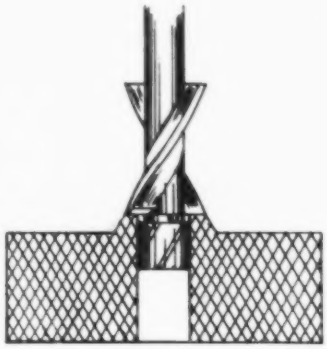
LAP ASSIGNMENT SHEET #3--DRILL PRESS OPERATIONS

NAME_____ SCORE_____

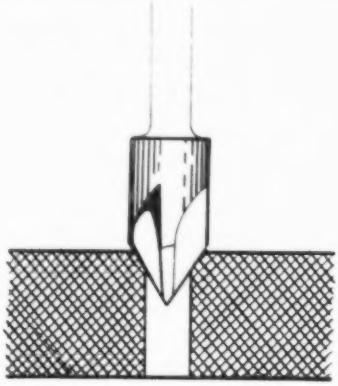
1. Identify the drilling operations shown.



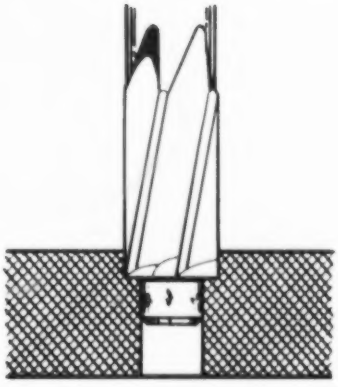
a. _____



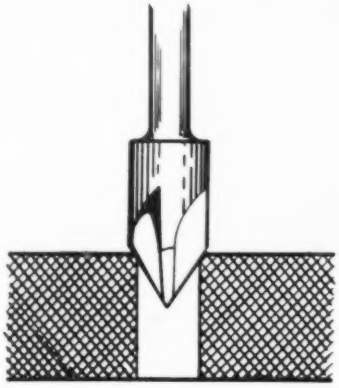
b. _____



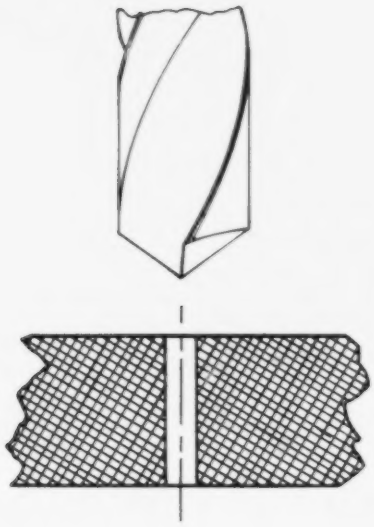
c. _____



d. _____

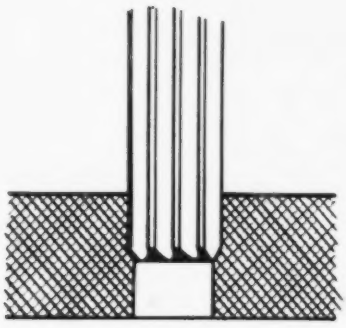


e. _____

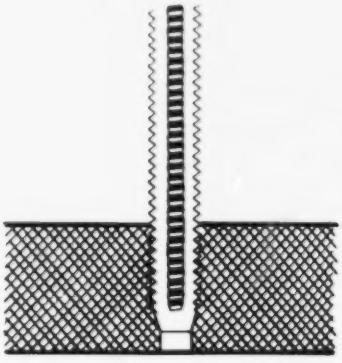


f. _____

g. _____



h. _____



i. _____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 11. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 11.

DRILL PRESS
UNIT II

LAP ASSIGNMENT SHEET #4--DRILLING MACHINE SAFETY

NAME _____ SCORE _____

1. Explain how each of the following words or phrases applies to drilling machine safety.

   a. Watches and rings -- _____

   b. Eyes -- _____

   c. Hands -- _____

   d. Chucks and other tools with tapered shanks -- _____

   e. Chips -- _____

   f. Clothing -- _____

   g. Deep holes -- _____

h. Work -- _____

_____

_____

i. Guards -- _____

_____

j. Table -- _____

_____

k. Feed pressure -- _____

_____

l. Chuck key or drill drift -- _____

_____

_____

_____

m. Tools -- _____

_____

_____

n. Drill chuck -- _____

_____

_____

_____

o. Floor -- _____

_____

_____

p. Drill drift -- _____

_____

_____

q. Drill press -- _____

_____

_____

r. Machine in motion -- _____

_____

_____

s. Rags -- _____

_____

_____

t. Spindle tapers -- _____

_____

_____

u. Hair -- _____

_____

_____

2. Stop. Have your instructor evaluate your Assignment Sheet. If you score 100 percent, continue to LAP Step 15. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 15.

DRILL PRESS
UNIT II

LAP ASSIGNMENT SHEET #5--CALCULATE SPEEDS AND FEEDS
FOR DRILLING OPERATIONS

NAME_____ SCORE_____

1. Calculate the rpm of a 5/8" H.S.S. drill with a cutting speed of 80 feet per minute when drilling hard cast iron 3/4" thick. Show your work.

   Answer: _____ rpm

2. Calculate the rpm of a 3/8" reamer. The hole being reamed was drilled with a H.S.S. drill in tool steel 1" thick with a CS of 60 feet per minute. What rpm should be used for the reamer? Show your work.

   Answer: _____ rpm

3. Use the chart below to answer the questions that follow.

High Speed Steel Drills									
Size of Drill	Feed per Rev.	Bronze, Brass, 300 Feet	Cast Iron, Annealed, 170 Feet	Cast Iron, Hard, 80 Feet	Mild Steel 120 Feet	Drop Forg., 60 Feet	Mal. Iron, 90 Feet	Tool Steel, 60 Feet	Cast Steel, 40 Feet
Ins.	Ins.	rpm	rpm	rpm	rpm	rpm	rpm	rpm	rpm
1/16	0.003	....	....	4880	....	3660	....	3660	2440
1/8	0.004	....	5185	2440	3660	1830	2745	1830	1220
3/16	0.005	....	3456	1626	2440	1210	1830	1220	807
1/4	0.006	4575	2593	1220	1830	915	1375	915	610
5/16	0.007	3660	2074	976	1464	732	1138	732	490
3/8	0.008	3050	1728	813	1220	610	915	610	407
7/16	0.009	2614	1482	698	1046	522	784	522	348
1/2	0.010	2287	1296	610	915	458	636	458	305
5/8	0.011	1830	1037	488	732	366	569	366	245
3/4	0.012	1525	864	407	610	305	458	305	203
7/8	0.013	1307	741	349	523	261	392	261	174
1	0.014	1143	648	305	458	229	349	229	153
1 1/4	0.016	915	519	244	366	183	275	183	122
1 1/2	0.016	762	432	204	305	153	212	153	102
1 3/4	0.016	654	371	175	262	131	196	131	87
2	0.016	571	323	153	229	115	172	115	77

a. What rpm should be used for drilling brass at a CS of 300 feet per minute with a 5/16" H.S.S. bit? _____ rpm

b. What rpm should be used for drilling cast steel at a CS of 40 feet per minute with a 1/4" H.S.S. bit? _____ rpm

c. What rpm should be used for drilling mild steel at a CS of 120 feet per minute with a 3/4" carbide bit? _____ rpm

4. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 19. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 19.